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The efficacy of special education services for students with learning disabilities: A longitudinal study

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THE EFFICACY OF SPECIAL EDUCATION SERVICES FOR STUDENTS WITH LEARNING DISABILITIES

A Longitudinal Study

A Dissertation

Presented to

The Faculty of the School of Education

The College of William and Mary in Virginia

In Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

by

Madeline N. Sobczak

April 1992

THE EFFICACY OF SPECIAL EDUCATION SERVICES FOR STUDENTS WITH LEARNING DISABILITIES

A Longitudinal Study

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CHAPTER I

INTRODUCTION

When The Education for All Handicapped Children Act of 1975, Public Law 94-142, was passed into law, it had as a major tenet the provision of an appropriate education for all students with disabilities. Webster's Third New International Dictionary defines appropriate as, ***specially suitable***. For students with disabilities ***specially suitable*** translated to ***special education***. A special education was one that would provide students with a chance for optimal growth and improvement; it would offer opportunities that did not exist in the general education environment. In short, it would be efficacious; it would be "characterized by qualities giving power to bring about an intended result" (Gove, 1981).

One significant issue in the field of education today centers on the problem of providing an efficacious education for students with disabilities. In December 1985, Madeleine Will, then Assistant Secretary for the Office of Special Education and Rehabilitative Services, U. S. Department of Education, delivered the keynote address at the Wingspread Conference on "The Education of Special Needs Students: Research Findings and Implications for Policy and Practice", held in Racine, Wisconsin. The title of her address was, "Educating Children with Learning Problems: A Shared Responsibility." In her address, Mrs. Will stated that, " . . . programs must

be allowed to establish a partnership with regular education to cooperatively assess the educational needs of students with learning problems and to cooperatively develop effective educational strategies for meeting those needs" (p. 415).

Mrs. Will's suggestion of shared responsibility has become known as either the "Regular Education Initiative" (REI) or the "Regular Education/ Special Education Initiative". Students with mild disabilities are the primary focus of this initiative, and the major purposes are to limit the number of students entering special education and to remove many students already in the ranks returning them to the mainstream of general education.

Response to the Regular Education Initiative from the special education community has been extensive. There are those who suggest that special education has not fulfilled its promise. Major reviews of research (Carlberg & Kavale, 1980; Glass, 1983; Madden & Slavin, 1983; Wang & Baker, 1985-86) have suggested that special education does not provide a more efficacious educational experience for the mildly disabled student. Instead, it often provides an inferior one and at best special education equals the education students receive in a general education setting. Many challenges to the efficacy of special education programming for the mildly disabled (Affleck, Madge, Adams & Lowenbraun, 1988; Bilken & Zollers, 1986; Glass, 1983; Gallagher, 1986; Marston, 1987-1988;

Schulte, Osborne & McKinney; 1990) can be linked to these reviews of research.

Biklen and Zollers (1986) state: "The strongest case against special education outside the regular class for mildly handicapped students is that it does not work. Efficacy studies from the 1930s to this day have consistently found that special classes are less effective or show no advantage over regular classes" (p. 582).

If these facts are true, they inevitably lead to the following question: If special education is more expensive than general education and students are worse or no better off, why continue to provide these programs? Perhaps Lilly (1986) stated the position best when he contended that, " . . . special education itself, particularly for students labeled mildly handicapped, has been the target of sufficient analysis and controversy in the 1980s to call into question the assumption that it is a generally more responsive and effective system than general education" (p. 10).

Other special educators question the wisdom of substantially reducing special education services to mildly disabled students before substantive concerns are addressed (Baker & Zigmond, 1990; Bryan, Bay & Donahue, 1988; Carnine & Kameenui, 1990; Gersten & Woodward, 1990; Hallahan, Keller, McKinney, Lloyd & Bryan, 1988; Jenkins, Pious & Jewell, 1990; Kauffman, Gerber & Semmel, 1988; Keogh, 1988; Lieberman, 1985; McKinney & Hocutt, 1988; Schumaker & Deshler, 1988; Semmel & Gerber,

1990; Teacher Education Division Council for Exceptional Children, 1986; Vergason & Anderegg, 1991; Wiederholt, 1989). These concerns include: the distribution of resources in a merged system; the need for policy analysis to guide research; inconclusive research on individual differences and multiple program models; the heterogeneity of the population with specific learning disabilities, that prevents uniform educational solutions for the population; problems of methodology in special education research; characteristics of secondary schools that will make it difficult to deliver services in general education settings; lack of evidence that cooperative learning, pre-referral teams, consulting teachers or peer-tutoring interventions are sufficient to support special needs students in general education (Hallahan, Kauffman, Lloyd, & McKinney, 1988).

Economic forces play an important part in this movement. We are in an era of declining revenues at the federal, state and local levels and special education is expensive. Combined with economic forces, we have demographic variables, both outside and within education, that are increasing the pressure for change. Demographers tell us that the student population of the United States is becoming increasingly minority, non-English speaking, poor, and from single parent families (Harris, 1988-89; Yates, 1986). Students with this profile are likely to experience school failure (Reynolds, 1984), and failure in the general education classroom is

the factor most apt to begin the process of referral for special education services (Yssledyke & Algozzine, 1984; Reynolds, 1984).

Within the school system, significant demographic changes have taken place in the population of students labeled mildly disabled since PL 94-142 was enacted in 1975. In the school year that followed, 1976-77, students with specific learning disabilities numbered 797,226 or 24.14% of the disabled population served under Chapter 1 and Education of the Handicapped Act, Part B. in the United States and Insular Areas. During the same time period, students with mental retardation numbered 969,562, or 26.14% of the population. By school year 1984-85, the population of students with specific learning disabilities had increased to 1,839,292 representing 42.15% of the special education population and the population of students with mental retardation had decreased to 717,785 and comprised only 16.45% of the total population (Ninth Annual Report to Congress, 1987, pp. E-10, E-11, E-13). The Thirteenth Annual Report to Congress (1991) shows that the population with specific learning disabilities continues to increase while the population with mild mental retardation continues to decrease, although at slower paces. Students with specific learning disabilities now comprise 48.5% of disabled students served under Chapter 1 and The Individuals with Disabilities Education Act, Part B, and currently number over two million (2,064,892). Students with mental

retardation currently account for 13.3% of the population, and number approximately one half a million students (507,331) (p. 13).

If the money for education were increasing, while the number of special education students were decreasing or remining stable, there might be less need to examine programs serving students with disabilities. However, at the present time the variables are inversely related. The population of students with specific learning disabilities is increasing and the funds available to educate them are decreasing. Because of this, there are increased demands to scrutinize programs and practices in special education. A close examination of special education practices does not reveal universal success, therefore a major challenge to special education for the mildly disabled rests on the issue of efficacy.

Need for Present Study

Dixon and Greenburg (1984-1985) stated that, "As state and federal requirements have been implemented to achieve a better continuum of services, available financial resources have diminished, renewing internal efficacy concerns" (p. 162). At a time when funds for education are decreasing, the number of students referred to and placed in special education is increasing (Algozzine & Korinek, 1985). Growing numbers of educators are questioning the efficacy of special education for the mildly disabled (Affleck, Madge, Adams & Lowenbraun, 1988; Bilken & Zollers, 1986; Glass, 1983; Gallagher, 1986; Marston, 1987-1988; Schulte,

Osborne & McKinney, 1990). Supervisors and administrators charged with providing appropriate services for disabled students are hampered in their decision making by the scarcity of longitudinal achievement data on students with specific learning disabilities (Kavale, 1988; Keogh, Major-Kingsley, Omori-Gordon, & Reid, 1982; McKinney & Feagans, 1984).

A comprehensive review of this knowledge base was conducted by Kavale in 1988. To "enhance the scope of the review", data was included for the categories of reading disability and hyperactivity (p. 303). While there is a sound rationale for including these populations, the necessity underscores the lack of comprehensive research done specifically with students with specific learning disabilities.

Not only is longitudinal data on the progress of students with specific learning disabilities scarce, it is inconclusive. Ambiguity exists both across and within the studies that have been conducted. On the positive side, following a ten year retrospective study, Major-Kingsley (1982) stated that, "The overwhelming impression from this study is that individuals with learning disabilities in childhood function in young adulthood in much the same way as do individuals who achieve adequately in school during childhood" (cited in Kavale, 1988, p. 329-330).

More often, however, studies have shown negative or mixed results. SRI International conducted a National Longitudinal Transition Study (NLTS) of Special Education for the Office of Special Education Programs. This five

year study included a nationally representative sample of more than 8,000 students. One report resulting from the study (Wagner, 1990) examined school performance and outcomes for students with specific learning disabilities. Information from the report suggests that students with specific learning disabilities currently spend most their time in general education with minimal support, and they are expected to perform under the same conditions as students who are not disabled. While the majority manage to make passing grades, Wagner states that:

> . . . Many students with learning disabilities are finding the regular education classroom a difficult environment in which to succeed. NLTS data suggest that students classified as learning disabled were more likely to do poorly in terms of grade failure the more time they spent in regular education classes, independent of their ability levels, IQ, or demographic characteristics (p. 28).

The research of McKinney (1989) and McKinney and Feagans (1984) reveals a pattern of declining achievement over time that may be improved, but not alleviated, by the provision of special education services. This is particularly true in the area of reading. McKinney states that, " . . . the speculation based on cross-sectional results indicating that LD children may fall progressively further behind their peers in reading was substantiated by

our longitudinal results" (p. 263). Mathematics showed a similar but less sharp decline over time.

In 1984, White and others examined the changes that take place in the aptitude and achievement discrepancies of LD students over time. White's initial study attempted to analyze the discrepancies of 276 students over a nine year span. Of the 276 students only 35 had achievement and aptitude data covering a six year period and only four had complete data for nine years. Therefore, the study was reduced and data analyzed for a three year time span. The results showed that there was a significant decline in achievement, independent of IQ, from time of placement to time of reevaluation. One serious limitation in applying this data may be that the full scale IQ of the sample with specific learning disabilities was 80, which raises questions about generalizing to a more capable group.

While the White and Wigle 1989 study addressed the same question, the approach was different. The authors used a T-score formula to compare the aptitude achievement discrepancies of 293 students. Two different criteria were chosen to indicate a moderate (10 T-score units or 1 standard deviation) or severe (15 T-score units or 1.5 standard deviations) discrepancy. Applying these criteria, four subgroups at each level of discrepancy were identified:

1. LD students not meeting either criterion at initial placement or 3-year reevaluation;

2. LD students who met one or both criteria at initial placement, but who met neither criterion at reevaluation;
3. LD students who met one or both criteria at reevaluation but not at initial placement; and
4. LD students who met one or both criteria at both times of assessment. (p. 15)

The major findings of the study differed by subgroup. Group one had IQ and achievement scores that were approximately equal at time of placement and both declined slightly over time. The second group had IQ scores that were much higher than achievement scores at time of placement. At reevaluation the IQ scores had declined and the achievement scores had improved so a discrepancy no longer existed. Group three had IQ and achievement scores that were approximately equal initially and both declined over time with a greater decline in achievement scores that created a discrepancy at reevaluation. The last group, found discrepant both times, had a pattern of declining achievement while IQ remained stable.

The findings from this study show the complexity of interpreting research with students with specific learning disabilities. Given different groups, it is possible to argue equally that: (a) students were improperly identified and therefore the results have no implication for students with specific learning disabilities; (b) students were properly identified and the provision of special education services resulted in improved achievement;

and (c) students were properly identified but special education did not improve student achievement.

Purpose of The Study

The purpose of this study was to examine the achievement of students with specific learning disabilities over a six-year period, from their initial placement in special education until their second triennial evaluation. The study esamined changes in achievement for the entire sample labeled as having specific learning disabilities and for three subgroups of this population. The subgroups were: (a) students whose criteria for classification as having specific learning disabilities included a discrepancy between achievement and their full scale IQ score; (b) students whose criteria for classification as having specific learning disabilities included a discrepancy between achievement and their verbal IQ score; and (c) students whose criteria for classification as having specific learning disabilities included a discrepancy between achievement and their performance IQ score. In addition the study examined relationships between achievement and the following nominal variables: (a) sex, (b) ethnicity, (c) area(s) of academic deficit, (d) type of functional deficit, and (e) level of services received.

Definition of Terms

The following terms are defined for purposes of this study:

Specific Learning Disability: The term "specific learning disability" means a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which may manifest itself in an imperfect ability to listen, speak, read, write, spell, or to do mathematical calculations. The term includes such conditions as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. The term does not include children who have learning disabilities which are primarily the result of visual, hearing, or motor handicaps, or mental retardation, or emotional disturbance, or of environmental, cultural, or economic disadvantage (USOE, 1977, p. 65083).

Severe Discrepancy: A discrepancy is considered "severe" when achievement in one or more of the skill development areas falls 15 or more standard score points below measured ability on accepted standardized testing. Standard score points will be used because " . . . only standard scores provide an appropriate metric to contrast students of varying ages and grades measured in different subject areas" (Tindal, 1985).

Aptitude: One of three measures of intelligence obtained through administering the Wechsler Intelligence Scale for Children - Revised (WISC-R). The three measures are: (a) Full Scale IQ Score (FIQ); (b) Verbal IQ Score (VIQ); and (c) Performance IQ Score (PIQ) (Wechsler, 1974).

Verbal IQ Score: The verbal score equals the sum of the child's scaled scores on the five regularly-administered Verbal tests of the Wechsler Intelligence Scale for Children - Revised (WISC-R). These tests are: 1. Information, 3. Similarities, 5. Arithmetic, 7. Vocabulary, and 9. Comprehension (Wechsler, 1974, p. 8 & p.114).

Performance IQ Score: The performance score equals the sum of the child's scaled scores on the five regularly-administered Performance tests of the Wechsler Intelligence Scale for Children - Revised (WISC-R). These tests are: 2. Picture Completion, 4. Picture Arrangement, 6. Block Design, 8. Object Assembly, and 10. Coding (or Mazes) (Wechsler, 1974, p. 8 & p.114).

Full Scale IQ Score: The full scale score is derived from the Verbal Score and the Performance Score obtained on the Wechsler Intelligence Scale for Children - Revised; hence it is based on ten tests (Wechsler, 1974, pp. 8 and 114).

Achievement: A linear combination of the standard scores obtained on the tests of reading, written language, mathematics, and knowledge as measured by Part II of the Woodcock-Johnson Psycho-Educational Battery.

Functional Deficits: Disorders in one or more of the basic psychological processes involved in using language, spoken or written (USO, 1977, p. 65083). They include, but are not limited to: visual processing, visual memory, auditory processing, auditory memory, or visual motor integration.

Disorders may exist singly or in combination (Fairfax County Public Schools, 1990, p. 4).

Level of Placement: Refers to the designation of services as LDR (Specific Learning Disabilities Resource) or LDSC (Specific Learning Disabilities Self-Contained. In addition, the level of placement represents the percentage of time the student is placed in special education classes as opposed to general education classes.

Hypotheses

It was the purpose of this study to examine the achievement of students with specific learning disabilities over a six-year period, from time of initial evaluation to time of second triennial. The research hypotheses investigated are:

H_o^1 There will be no significant increase in achievement over a six-year period for all students classified as exhibiting a specific learning disability and manifesting a discrepancy between aptitude, as measured by the WISC-R Standard Scores, and achievement, as measured by Part II of the Woodcock-Johnson Psycho-Educational Battery Standard Scores.

H_o^2 There will be no significant increase in achievement over a six-year period for the group of students

classified as exhibiting a specific learning disability and manifesting an aptitude achievement discrepancy between full scale IQ, as measured by the WISC-R Standard Score, and achievement, as measured by Part II of the Woodcock-Johnson Psycho-Educational Battery Standard Scores.

H_0^3 There will be no significant increase in achievement over a six-year period for the group of students classified as exhibiting a specific learning disability and manifesting an aptitude achievement discrepancy between verbal IQ, as measured by the WISC-R Standard Score, and achievement, as measured by Part II of the Woodcock-Johnson Psycho-Educational Battery Standard Scores.

H_0^4 There will be no significant increase in achievement over a six-year period for the group of students classified as exhibiting a specific learning disability and manifesting an aptitude achievement discrepancy between performance IQ, as measured by the WISC-R Standard Score, and achievement, as measured by Part II of the Woodcock-Johnson Psycho-Educational Battery Standard Scores.

H_0^5 Controlling for aptitude there will be no significant relationship (individually or in combination) between achievement, as measured by Part II of the Woodcock-Johnson Psycho-Educational Battery Standard Scores and the following characteristics: (a) sex, (b) ethnicity, (c) area(s) of academic deficit, (d) type of functional deficit and (e) level of services received.

Limitations of the Study

The proposed study is an example of an ex post facto model using a repeated measures design in which each subject was tested on the same measures three times during a six-year period. Because students were not assigned randomly to groups, and no comparable control group existed, it is impossible to suggest cause and effect outcomes. However, it is possible to suggest the strength and direction of relationships that may exist between the dependent and independent variables.

Because the study uses an ex post facto model, it was impossible to account for attrition during the six-year period. Students could be lost because they move to another school system or because they no longer qualify for services. Therefore, it is possible that either the most debilitated or the most successful students would no longer be in the sample at the end of six years.

In conducting research within any school system the criteria established for programs, and the means for determining the criteria, are not under the control of the researcher. In the current study the system requires a 15 point discrepancy between ability and achievement as determined by a difference between the standard scores on the Woodcock-Johnson Part II and the WISC-R. Therefore, it is possible that students identified as having a specific learning disability would not meet the requirements in systems that used a more stringent discrepancy requirement, or used a regression model to measure that discrepancy.

In addition, the school system participating in the study may not be representative of other school systems in either the State of Virginia or the United States. Lack of parity may be due to both system and student variables.

Any conclusions reached in the study are limited to a population with specific learning disabilities that met the characteristics of the sample group and do not apply to students with specific learning disabilities identified using differing criteria or test instruments, or to any other mildly disabled special education population.

CHAPTER II

REVIEW OF LITERATURE

Summary of Rationale and Relationship to Problem

The examination of efficacy in special education programs is complex. It involves the historical analysis of practices intended to promote the fundamental goal of providing appropriate and meaningful educational experiences for students. Examining competence in educational programs involves answering questions concerning how well the system meets its primary goal of improved educational outcomes for the youth of the nation. In that context, answers require that special education be viewed as a subset of general education rather than a separate system. Many difficulties encountered in special education are simply extensions of problems that began in the broader educational setting. In fact, it could be argued that special education exists precisely because of these problems (Algozzine & Maheady, 1986; Skirtic, 1987). In no case would the suggestion make more sense than in the case of decision making concerning the ways in which students are classified and grouped for the delivery of instruction.

"The organization of a system of mass education involves, at every level, the assignment of individuals to groups" (Yates, 1966, p. 11). Such a division must occur along both a vertical and a horizontal dimension with more interest aroused by the later (Esposito, 1973). In 1966, Yates stated that while many criteria are available for making grouping decisions, i.e.,

age, sex, religion, geographic location, socioeconomic status, race, language, special needs and ability, the last criterion has generated the most heated and prolonged debate.

While grouping decisions based on ability have created extensive debate, grouping decisions based on race have engendered as much controversy. It may be suggested that the two are inextricably related issues as historical evidence shows that special classes for students of low ability are frequently synonymous with classes for minority students. On November 29, 1975, President Gerald Ford signed into law P.L. 94-142, The Education for All Handicapped Children Act (EAHA). Passage of this law culminated efforts based on the criterion of special needs. Answers to the question of efficacy in educational programming for mildly handicapped students involve examining the combination of ability, race, and special needs as interrelated criteria used in grouping children for purposes of instruction.

While these criteria appear as separate variables in Yates' list (1966), the distinction may be illusionary. More than half the special education population is comprised of individuals who are tested and classified as either mentally retarded or specifically learning disabled. Together these students constitute 61.8% of the special education population or more than three million students (Thirteenth Annual Report to Congress, p. 13). For this combined group, ability remains a primary determinant of educational

placement and programming. Minority children and youth have been traditionally placed in special education in disproportion to their number in the general school population (Chinn & Hughes, 1987; Elliott, 1987; Heller, Holtzman, & Messick, 1982; Prillaman, 1973; Richardson, 1989; Tucker, 1980). This practice challenges the assumption that race is a distinct variable, separate from special needs and ability, used to decide special class placement.

The issue of disproportion emerges from a more fundamental consideration, a consideration of the interplay between the goals of equality and equity. According to Webster's Third New International Dictionary (1981), equality has to do with "sameness", while equity has to do with "fairness". Green (1983) stated, "Inequity always implies injustice. Inequality does not. Persons may be treated and rewarded unequally, and also justly. They cannot, however, be treated or rewarded inequitably and also justly" (p. 28). The use of race, ability and special needs, alone and in combination, as the criteria for grouping individuals in schools have been the basis for challenges to the equality and equity of schooling.

Legal Influences on Grouping Practices

Lipsky and Gartner (1989) state that, "Throughout the history of the common school, there has been tension between inclusion and exclusion" (p. xxiii). Proponents for inclusion have often employed the legal arena to

challenge the use of race and special needs as criteria for excluding students from the educational mainstream.

Race as a Criterion for Grouping

The practice of using race as a criterion for grouping children was first challenged in 1850 in the state of Massachusetts. In the case Roberts v. City of Boston, Sarah Roberts' father hired Charles Sumner to challenge the fact that his only child passed five elementary schools on her way to class at the Smith Grammar School for Negro children. Justice Shaw of the Massachusetts Court was unconvinced by arguments that the school for black children was inferior to the schools that were attended by white children of the city. "In his historical opinion [he] set forth the 'separate-but-equal' doctrine which would prevail for so long" (Alexander, 1980, p. 455).

In 1868, in an attempt to ensure protection for the newly freed slaves of the South, the Fourteenth Amendment, with its equal protection of the laws provision, was ratified. Despite passage of the amendment "separate-but-equal" laws became the norm in southern states. In 1896 the Supreme Court heard the Plessy v. Ferguson case in which the State of Louisiana maintained that it was legal to require separate seating arrangements for blacks and whites on trains. The Court's decision favoring the State of Louisiana meant, "in essence, [that] the Court made the Equal Protection Clause subject to custom and tradition in accordance with legislative

interpretation, no matter how blatantly and objectionably the law affected a particular classification of people" (Alexander, 1980, p. 457).

The separate-but-equal rule was extended to schools and was not challenged until the 1930s. From 1930 until the fifties challenges were mounted to the doctrine. These challenges were aimed at colleges and universities and Court findings slowly eroded the foundations and legitimacy of separate facilities (Missouri ex rel. Gaines v. Canada; Sweatt v. Painter; McLaurin v. Oklahoma State Regents for Higher Educ.) (Alexander, 1980).

It was not until Brown v. Board of Educ. reached the Supreme Court in 1952 that the challenge to separate-but-equal schools was extended to include elementary and secondary public schools. Brown v. Board of Educ. was actually four separate cases from four distinct areas of the country that were combined and heard as one by the Supreme Court. The separate cases came from Kansas, South Carolina, Delaware, and Virginia. According to Alexander (1980):

> These cases combined then presented a range of situations by which the Supreme Court could comprehensively view the segregation issue. The Kansas case involved permissive segregation legislation in a northern state for elementary children; in the Virginia case a compulsory segregation law was used to segregate high school students in an upper southern state; and South Carolina represented the Deep South and

> Delaware a border state. The District of Columbia case drew due process and Congressional power into question. The differing circumstances and the wide geographical distribution gave the decision more importance and imbued it with a national flavor and aura (p. 461).

The unanimous decision was written by Chief Justice Earl Warren; it unequivocally stated that separate was not equal. In Warren's words, "We conclude that in the field of public education the doctrine of separate but equal has no place. Separate educational facilities are inherently unequal" (Brown v. Board of Educ.). Following the Court's decision in Brown v. the Board of Educ., the long process of dismantling segregated school systems began; it is still in process today. In cases where race was the single criterion for grouping, inequality was found to constitute an inequity.

Special Needs as a Criterion for Grouping

Litigation in special education proceeded on several fronts. It often involved not only inappropriate educational placement, but lack of any educational placement provided for students who were seen as "unable to benefit" from educational programming. Linked with exclusion were issues of race and the appropriateness of tests used to classify students according to aptitude.

One of the first cases to contest grouping practices with special needs students was Hobson v. Hanson, which challenged the tracking system in

use in the Washington D.C. public schools. On the basis of standardized aptitude test scores, children were permanently placed into one of three educational tracks: honors, general, or special curriculum. In deciding the case in favor of the plaintiff, Judge Wright ordered the abolition of the tracking system on the grounds that it was a violation of the equal protection clause of the United States Constitution. In addition he found a disproportionate number of the students in special classes were black due to the cultural bias in tests used to determine ability (Prillaman, 1973, p. 63).

Perhaps the most important inclusion case was brought against the State of Pennsylvania by the Pennsylvania Association for Retarded Citizens (PARC). In PARC, the plaintiffs challenged the constitutionality of statutes that allowed schools to exclude students on the basis of retardation (MacMillan, Meyers, & Morrison, 1980). "The court ordered the state to adopt regulations regarding procedures for changes in the status of mentally retarded students" (Prillaman, 1973, p. 68). The regulations foreshadowed PL 94-142 in their requirements: children five years six months through twenty-one years were included; parents (in all occurrences of the word parents include "or legal guardian") were to be notified, in writing, before any change in educational placement was made; actions to be taken were to be described in detail; parents had the right to contest the decisions of schools and to be represented by counsel; parents had the right to examine all testing and documents to be used in decision making; parents could

request independent testing at cost to the school system; parents had the right to a hearing to appeal system decisions, and written records of proceeding were to be kept and made available to parents (Pennsylvania Association for Retarded Children, Civil Action No. 71-42).

Two California cases had a major impact on the classification and placement of minority children in special education programs, Diana v. State Board of Education and Larry P. v. Riles. Both cases challenged the use of ability tests with minority students. In Diana v. State Board of Education, the plaintiffs were Mexican-American students placed in classes for the mentally retarded. They contended the arguments underlying the Brown v. Topeka case were valid here. "From Diana came the mandate that school districts must avoid a disproportionate number of ethnic minority children in EMR placements" (MacMillian et al., 1980). Larry P. v. Riles was brought on behalf of Negro students who were " represented in [EMR] class at over twice their proportion in the general school population" (Elliott, 1987, p. 1). Because of this case, California banned the use of mental tests as the basis for placing black students into EMR classes.

Early litigation in special education also relied heavily on the issue of equality, or its converse inequality. Equal opportunity was mandated for students with handicaps who previously had been denied access to a free public education. Tests that identified unequal numbers of minority students for placement in programs for the mentally retarded students were banned.

Despite these mandates, exclusion continued most notably through the establishment of special services and classes.

> In New York City, for example, with a total school population of nearly one million pupils, there are more than 100,000 students in special education programs, over 310,000 students in the federal and state remedial programs, and nearly 73,000 in the mislabeled bilingual education - in sum, nearly half a million students (Lipsky & Gartner, 1989, pp. xxiii & xxiv).

Educational Research on Grouping

Heller, Holtzman, and Messickprinciple (1982) placed the issues of equality and equity in education in this perspective:

> Disproportion in EMR classes may be indicative of a significant inequity if children are invalidly placed in such programs, if poor instruction in the regular classroom increases the likelihood that certain children more than others will be referred or placed in EMR classes, or if EMR classes do not provide instruction commensurate with the functional needs of the individual. Thus, by focusing on the conditions under which the inequality of placement proportions signals inequity of treatment, two major educational issues are highlighted: the validity of referral, assessment, and placement procedures and the quality of instruction received, whether in the regular classroom or in

> special education settings. . . . If [a] new focus leads to the formulation of effective instructional programs for individuals in the least restrictive environment, then the statistical issue of disproportion - by race or ethnicity or by sex - ceases to be a problem (p. 30).

Since many of today's arguments regarding the efficacy of special education programming for the mildly disabled appear to echo and reinforce the findings of the early general education research on ability grouping, an overview of that body of research will be provided. The findings from the general education overview will be linked with the efficacy studies currently emanating from special education. Conclusions will be drawn regarding the degree to which the findings can be generalized to the entire population of mildly disabled students.

If the terminology is changed, the current efficacy debate in special education closely mirrors the debate that surrounded the issue of ability grouping in general education. To make these substitutions, one would change homogeneous grouping to "special classes" and heterogeneous grouping to "regular classes or mainstream classes". In addition, the term low ability students would be replaced with the term "mildly disabled students". Once this is done, the conclusions reached are startlingly similar as this quotation from Biklen and Zollers (1986) shows: "The strongest case against special education outside the regular class for mildly

handicapped students is that it does not work. Efficacy studies from the 1930s to this day have consistently found that special classes are less effective or show no advantage over regular classes" (p. 582).

To provide the general education perspective on ability grouping, the findings of six major reviews of research will be summarized. Those addressed will be: (a) Grouping in Education by Yates, 1966; (b) Homogeneous and Heterogeneous Ability Grouping: Principle Findings and Implications for Evaluating and Designing More Effective Educational Environments by Esposito, 1973; (c) The Pros and Cons of Ability Grouping by Findley and Bryan, 1975; (d) Ability Grouping: Why Do We Persist and Should We? by Froman, 1981; (e) Effects of Ability Grouping on Secondary School Students: A Meta-analysis of Evaluation Findings by Kulik and Kulik, 1982; and (f) Overview of Research on Ability Grouping by Raze, 1984. Except for the review by Kulik & Kulik, the reviews arrived at similar conclusions concerning the effect of ability grouping on academic achievement.

1. Homogeneous ability grouping as currently practiced shows no consistent positive value for helping students generally, or particular groups of students, to achieve more scholastically or to experience more effective learning conditions. Among the studies showing significant effects, the

slight gains favoring high ability students are more than offset by evidence of unfavorable effects on the learning of students of average and below average ability, particularly the latter. (Esposito, 1973)

2. Ability grouping, as practiced, produces conflicting evidence of usefulness in promoting improved scholastic achievement in superior groups, and almost uniformly unfavorable evidence for promoting scholastic achievement in average or low-achieving groups. (Findley & Bryan, 1975)
3. Only high-ability groups show academic benefits in ability grouped classes. Average and low-ability groups show no cognitive gains over mixed-ability arrangement, and sometimes, show less achievement in homogeneously grouped classes. (Froman, 1981)
4. Gifted students learn more and score higher on achievement tests when they are placed in advanced classes. Low ability students do no better in their low ability track than they would in an average, or heterogeneous, class. (Raze, 1984)

5. Research into various forms of grouping within schools has been abundant but inconclusive. Some investigations into the effects of grouping pupils according to their abilities and attainments have yielded results favorable to homogeneous grouping; some have indicated that heterogeneous grouping leads to superior attainment; others show that there is no significant difference between the two. (Yates, 1966)

6. Grouping generally has small effects on student achievement. But, special honors programs often had beneficial effects on the performance of gifted and talented students. Ability grouping had only trivial effects on the achievement of average and below average students. The effect of grouping is near-zero on the achievement of average and below average students; it is not negative. (Kulik & Kulik, 1982)

To provide the special education perspective on grouping, the major findings of two major reviews are summarized. The studies are: (a) The Efficacy of Special Versus Regular Class Placement For Exceptional Children:

A Meta-Analysis, by Carlberg and Kavale, 1980; (b) Mainstreaming Programs: Design Features and Effects, Wang and Baker, 1985-86;

1. The results of existing research when integrated statistically demonstrated that special class placement is an inferior alternative to regular class placement in benefiting children removed from the educational mainstream. (Carlberg & Kavale, 1980)
2. No great differences among classes of outcome measures were identified. Thus, regardless of whether achievement, personality/social, or other dependent variables were chosen for investigation, no differential placement effects emerged across studies. Similarly, (other). . . variables had little effect on the relative superiority of regular class placement to special class placement. (Carlberg & Kavale, 1980)
3. An overall positive effect of mainstreaming was found. This finding was reflected in the mean weighted effect sizes of all three categories of outcome measures as well as in the total effects across all studies. (Wang & Baker, 1985-86)

3. A comparison of full-day special placement and full-day regular class placement for EMR students clearly indicated that placement in regular class resulted in increased academic achievement and that this achievement increased over time. (Wang & Baker, 1985-86)

Carlberg and Kavale (1980) identified 860 studies for possible inclusion in their meta-analysis. Selection criteria were: (a) The study had to investigate educational placement for an identifiable category of exceptionality. (b) The study had to examine special class placement. (c) The study had to include a comparison group even if the comparison group was the same as the special class group (as in a correlated group pretest-post-test design). (d) The study had to report results in a fashion that could be translated into a form appropriate for meta-analysis. Of the original 860 studies, only 50 met the inclusion criteria.

Carlberg and Kavale (1980) referenced all the studies used in their meta-analysis. From this list, one can deduce that 38 of the studies analyzed referred to the mildly retarded population, five to the ED/BD population and one to the LD population. For analysis, the learning disabled population was collapsed into a group with the behaviorally disordered/ emotionally disturbed group. The remaining studies were referenced in such a way as to make the identification of the population uncertain. Even with

the ambiguous studies considered, it is apparent that the results of the meta-analysis are most properly applied to the mentally retarded portion of the special education population termed mildly disabled.

Thus the primary finding of the analysis " . . . that special class placement is an inferior alternative to regular class placement in benefiting children removed from the educational mainstream" (Carlberg & Kavale, 1980, p. 304) should be applied only to a particular portion of the mildly disabled population. In fact, the review suggests that there were positive effects from special class placements for LD and BD/ED children. The reviewers caution that "Special class placement was not uniformly detrimental, but appears to show differential effects related to category of exceptionality" (p. 304). This finding does not "get much press" in articles challenging the efficacy of special education programming.

The review by Wang and Baker (1985-86), also used meta-analysis as the tool to bring order to the conflicting results produced by years of research in special education. They reported " . . . that mainstreamed disabled students consistently out performed nonmainstreamed students with comparable special education classifications" (p. 503). This statement contradicts information (presented in the table on page 513 of the article) that shows a negative effect size for achievement for the learning disabled population. In this study, a negative-effect size indicated that the special

education placement was preferable to the general education placement for the variable under consideration.

The meta-analysis included eleven studies with a combined population of 541 students. According to Wang and Baker, "fifty-three percent of the comparisons [made] were of students classified as mentally retarded; 3% were of students with specific learning disabilities [the number of students per comparison was 19]; 19% were of hearing-impaired students; and 25% were of students with mixed categories of exceptionalities" (p. 508).

Caution must be used in generalizing the findings from both studies for two reasons. First, the population represented by the studies is not typical of the population termed mildly disabled; most studies were of students with educable mental retardation [EMR], who comprise only 13% of today's total special education population (Thirteenth Annual Report to Congress). Secondly, the age of the studies suggests that generalizing to students who are classified as EMR today may be just as inappropriate since population parameters have changed significantly since 1973.

Madden and Slavin (1983) suggest that the dynamics hypothesized for poor results in tracking for general education, may be factors that explain failure of students with mild academic handicaps to demonstrate increases in achievement. It is possible that the reviews of research on grouping look so much the same, whether one takes the general education perspective or the special education perspective, because they are speaking of the same, or

closely overlapping, populations. It is conceivable that legal decisions resulting in desegregation interacted with expanding special education programs and caused these expanded programs to include disproportionate numbers of black students. Thus desegregation efforts resulted in integrated schools with segregated programs and classrooms (Elliott, 1987). The disproportionate numbers of racial and ethnic minorities filling programs for mildly retarded students resulted in legal cases that challenged these placements. Decisions reached by the courts in Diana and Larry P. established testing and placement restrictions that created the population of students labeled as mildly disabled today. That population, despite litigation, is still disproportionately minority but the categories are shifting (Richardson, 1989; Tucker, 1980). The major shift is one forecast by Hallahan and Kauffman in 1977:

> This change in defining mental retardation, however, also has critical implications for the field of learning disabilities. We would be rather naive to believe that suddenly children with IQs between 69 and 85 could all be easily integrated into the regular classroom mainstream. The change in the definition, if implemented, will undoubtedly have profound effects on classes for the learning disabled. In other words, many children who were mentally retarded will overnight become learning disabled (p. 141).

Related Research

A second factor that limits decision making concerning the efficacy of special education for this population is the scarcity of longitudinal research with students with specific learning disabilities (Kavale, 1988; Keogh, Major-Kingsley, Omori-Gordon, & Reid, 1982; McKinney & Feagans, 1984). A comprehensive review of this knowledge base was conducted by Kavale in 1988. To "enhance the scope of the review" data was included for the categories of reading disability and hyperactivity (p. 303). While there is a sound rationale for including these populations, the necessity underscores the lack of comprehensive research done specifically with students with specific learning disabilities.

Not only is longitudinal data on the progress of students with specific learning disabilities scarce, it is inconclusive. Ambiguity exists both across and within the studies that have been conducted. On the positive side, following a ten year retrospective study, Major-Kingsley (1982) stated that, "The overwhelming impression from this study is that individuals with learning disabilities in childhood function in young adulthood in much the same way as do individuals who achieve adequately in school during childhood" (cited in Kavale, 1988, p. 329-330).

More often, however, studies have shown negative or mixed results. SRI International conducted a National Longitudinal Transition Study of Special Education for the Office of Special Education Programs. This five-

year study included a nationally representative sample of more than 8,000 students. One report resulting from the study (Wagner, 1990) examined school performance and outcomes for students with specific learning disabilities. Information from the report suggests that students with specific learning disabilities currently spend most their time in general education with minimal support, and they are expected to perform under the same conditions as students who are not disabled. While the majority manage to make passing grades, Wagner states that:

> . . . Many students with learning disabilities are finding the regular education classroom a difficult environment in which to succeed. NLTS data suggest that students classified as learning disabled were more likely to do poorly in terms of grade failure the more time they spent in regular education classes, independent of their ability levels, IQ, or demographic characteristics (p. 28).

The research of McKinney (1989) and McKinney and Feagans (1984) suggests that academic deficits of students with specific learning disabilities increase over time. This is particularly true in the area of reading. McKinney (1989) states that, " . . . the speculation based on cross-sectional results indicating that LD children may fall progressively further behind their peers in reading was substantiated by our longitudinal results" (p. 263). Mathematics showed a similar but less sharp decline over time.

White (1984) and White & Wigle (1989) examined the changes that take place in the aptitude and achievement discrepancies of LD students over time. White's initial study attempted to analyze the discrepancies of 276 students over a nine-year span. Because "only 35 individuals had achievement and aptitude data over a six-year period while four persons had complete data over nine years" (p. 4), only a three-year span was used. The results showed that there was a significant decline in achievement, independent of IQ, from time of placement to time of reevaluation. One serious limitation in applying this data may be that the full scale IQ of the sample having specific learning disabilities was 80, which raises questions about generalizing to a more capable group.

While the White and Wigle (1989) study addressed the same question, the approach was different. The authors used a T-score formula to compare the aptitude achievement discrepancies of 293 students. Two different criteria were chosen to indicate a moderate (10 T-score units or 1 standard deviation) or severe (15 T-score units or 1.5 standard deviations) discrepancy. Applying these criteria, four subgroups at each level of discrepancy were identified:

> LD students not meeting either criterion initial placement or 3-year reevaluation; LD students who met one or both criteria at initial placement, but who met neither criterion at reevaluation; LD students who met one or both criteria

> at reevaluation but not at initial placement; and LD students who met one or both criteria at both times of assessment (p. 15).

The major findings of the study differed by subgroup. Group one had IQ and achievement scores that were approximately equal at time of placement and both declined slightly over time. The second group had IQ scores that were much higher than achievement scores at time of placement. At reevaluation, the IQ scores had declined and the achievement scores had improved so a discrepancy no longer existed. Group three had IQ and achievement scores that were approximately equal initially and both declined over time with a greater decline in achievement scores that created a discrepancy at reevaluation. The last group, found discrepant both times, had a pattern of declining achievement while IQ remained stable. The findings from this study illustrate the complexity of interpreting research with students with specific learning disabilities. Given different groups, it is possible to argue equally that: (a) students were improperly identified and, therefore, the results have no implication for students with specific learning disabilities; (b) students were properly identified and the provision of special education services resulted in improved achievement; and (c) students were properly identified but special education did <u>not</u> improve student achievement.

Intelligence and Its Relationship to Learning Disabilities

Perhaps the difficulty in interpreting the findings from the longitudinal research in general and the specific study by White and Wigle (1989) exists because the rubric "specific learning disabilities" encompasses distinctly different populations. Considerable research documents the difficulties in the referral, identification, and placement process (Ysseldyke, 1988; Ysseldyke, Algozzine, & Epps, 1983; Ysseldyke, Algozzine, Shinn, & McGue, 1982). While an in depth analysis of the debate concerning the construct of intelligence, its meaning and its measurement, is beyond the scope of this research, the general issues will be examined. This will be done to establish perspective because, despite debate, the construct of IQ remains central to the definition of a learning disability. Beyond the definition and measurement of IQ, three issues related to IQ are apparent in the literature and research base on school-identified populations having specific learning disabilities.

The first issue relates to the very definition, for to be LD is to demonstrate a severe discrepancy between aptitude, most frequently measured and reported as an IQ figure, and academic achievement. As Bryan (1989) points out, "The inclusion of the discrepancy statement in the definition of learning disabilities was critical to the development and acceptance of the category of learning disabilities as distinct from educable mental retardation" (p. 480). Efforts have gone into defining what constitutes a severe

discrepancy and deciding how to measure it. Second, attempts have been made to identify an IQ profile, derived from scores on subtests, which would distinguish the "true" learning disabled child from his peers. Third, the literature and research have questioned the extent to which groups of students with specific learning disabilities " . . . could be more accurately described as slow learners, as children with second-language backgrounds, as children who are naughty in class, as those who are absent more often or move from school to school, or average learners in above average school systems" (Shepard, Smith, & Vojir, 1983, p. 82).

Historical Overview of Intelligence

The intelligence debate involves two primary issues: the source of intelligence and its immutability. To cast the debate into its extreme forms, intelligence is either primarily inherited or largely determined by environmental factors; it is determined by nature or by nurture. IQ is either a constant fixed construct, or it is a fluid and variable one.

In 1904, the French government commissioned Alfred Binet and Theodore Simon to develop a test that would identify children who, because of their retarded development, would not profit from regular schooling. Henry Goddard translated the work of Binet and Simon into English and, although Binet and Simon had avoided relating the scales they had developed to any idea of "intelligence", Goddard did not. The idea that intelligence is an inherited, largely predetermined and immutable attribute

gained credence in the United States through Goddard's work (Blatt, 1987). "In study after study, Goddard 'proved' that the poor produce feebleminded children and that immigrants duplicate in their children their feeblemindedness and coarse manners" (Ibid, p. 311). Within ten years the validity of much of Goddard's work was questioned but the impact remained.

As the current debate on intelligence was brought into focus during the 1960s, it must be viewed in the political context of the times. The sixties were a decade of political and social action aimed at repairing the damage discriminatory segregation had inflicted on American blacks. Education was an arena in which disproportionate numbers of minority children were failing, and reasons for that failure were sought. Links were declared between the conditions of poverty, imposed by racism, and failure to do well in school. While intelligence testing consistently produced lower scores for minority children, the scores were interpreted as the results of the poor living conditions attending poverty as well as bias in test construction. In this view, IQ was largely determined by environmental factors and could be changed (Elliott, 1987).

Despite the new emphasis on environment as a cause of differences in intelligence, the explanation was not universally accepted. In 1969, Jensen published a controversial paper, "How Much Can We Boost IQ and Scholastic Achievement?" In this work, he suggested that racial differences

in intelligence test scores were the function of differences inherent between the races. He suggested that as much as 80% of the variance between races on measures of intelligence could be attributed to inherited characteristics.

The work of Jane Mercer was the antithesis of Jensen's. Mercer believed that environment was the primary determinant of intelligence and took issue with the tests used to measure the construct. During testimony for the plaintiffs in the Larry P. case, she explained what she believed the WISC-R measured, "It is a measure of conformity of middle-class expectations for the typical child in the typical public school in the United States and just another adaptive behavior" (cited in Elliott, 1987, p. 73). For Mercer, "there were no differences in intelligence among ethnic groups, despite differences in test scores. . . . [Her] view of intelligence is that it is innate potential and not current performance" (Elliott, 1987, p. 74). Her basic premise was that poor minority children would not do badly in school if they had the benefit of enriched environments.

The debate over the nature of intelligence continues today. Stanovich (1989) attributes much of the controversy in the field of learning disabilities to the inclusion of the construct of intelligence into the operational definition of learning disabilities. He stated:

> The LD field seems addicted to living dangerously. . . . [T]he decision to base the definition of a . . . disability on a

> discrepancy with measured IQ is still nothing short of astounding. Certainly one would be hard-pressed to find a concept more controversial than intelligence in all of psychology. It has been the subject of dispute for decades, and this shows no sign of abating (p. 487).

In 1989, the entire October issue of the Journal of Learning Disabilities was devoted to an examination of the role of intelligence in the definition and determination of learning disabilities. Perhaps the most "provocative stand" (Wong, 1989, p. 468) was taken by the Siegel paper titled, "IQ is Irrelevant to the Definition of Learning Disabilities". Siegle questioned the continued usefulness of IQ testing on theoretical, empirical and social grounds. She challenged the assumptions that IQ tests measured intelligence and that a discrepancy between IQ and achievement is a necessary condition for a specific learning disability.

Responses to Siegel's position revealed an appreciation of the problems she identified but a reluctance to support her entire premise. The following were typical reactions:

Bryan (1989) disagreed with Siegle's definition of intelligence, but supported her belief that relying on intelligence and the tests used to determine IQ, presented more problems than they solved. However, he believed that both would be abandoned with great reluctance until we could

develop a way to assess "a disorder in one or more of the basic psychological processes . . ." (p. 480).

Torgensen (1989) acknowledged problems related to current IQ tests as measures of general intellectual aptitude. He believed that the subtests lacked a theoretical basis that would make them a measure of skills which underlie school learning. Rather, the subtests are samples of the type of knowledge and skills required for school learning. Torgensen went on to state that he believed IQ to be necessary for research purposes but that he was, ". . . less sure that present knowledge justifies its use in the selection of children for special services" (p. 455).

Graham and Harris (1989) disagreed with the basic premise that intelligence, or its proxy IQ, was irrelevant to the definition of learning disabilities. They pointed out that research has consistently shown a correlation between measures of intelligence and achievement, and that the concept of a learning disability was premised on the absence of such a relationship for children who have, "average or above-average intelligence but suffer from a brain/cognitive deficit that has relatively specific effects" (p. 500). They further contend that it is this very specificity that is essential to distinguish students with learning disabilities from other low achieving students.

Stanovich (1989) was in fundamental agreement with the thrust of Siegle's reasoning but took issue with her portrayal of IQ as a construct that

did not measure any real structure or function. He argued that constructs, indirect inferences from behavior, are always present in theories. Stanovich believed that Siegle's real disagreement was not with the construct of intelligence but rather with the way in which the construct had been operationalized.

While the concept of intelligence and ways in which to quantify it remain elusive, the eleven prominent definitions of learning disabilities reviewed by Hammill (1990) all include an underachievement element. This element is conceptualized as either an, " . . . [I]ntraindividual ability difference . . . [or] an aptitude-achievement discrepancy. . . . Obviously, the use of aptitude-achievement discrepancy is a special application of the intraindividual ability approach" (Hammill, 1990, p. 80). Despite current and historical controversy surrounding the definition and measurement of intelligence, IQ remains an integral part of the concept of learning disabilities.

Concept of Severe Discrepancy

The presence of a "severe discrepancy between achievement and intellectual ability" (Federal Register, 1977, 42, p. 655082) is a criterion for determining the existence of a learning disability. However, Federal rules and regulations do not define a severe discrepancy nor specify a method for determining that one exists (Keogh, 1988). Rivers and Smith (1988) report that a severe discrepancy may be conceptualized in three ways:

1. Differences between the Verbal and Performance IQ scores of the WISC-R when the Full scale IQ score falls in the average or above-average range.
2. Differences between the scaled scores of the specific subtests of the WISC-R.
3. Differences between ability, operationalized as the Full Scale IQ score on the WISC-R, and the achievement levels, operationalized as either standard achievement scores or grade-level scores compared to expected levels of achievement. (p. 642)

Whichever conceptualization of severe discrepancy is accepted, a comparison between aptitude and achievement must be made. There are four approaches to quantifying the differences between aptitude and achievement to arrive at a discrepancy score (Chalfant, 1985; Cone & Wilson, 1981).

1. The grade level discrepancy methods using constant deviation are easily administered, but over identify slow learners and under identify students with high IQs.
2. Achievement level expectancy formulas identify severe discrepancies, but are dependent on

questionable scores from intelligence tests. These formulas fail to account for the number of years a student has attended school and rely on an arbitrary severity level.

3. Standard score discrepancy models answer the statistical criticism of expectancy formulas, but fail to account for the regression toward the mean
4. Regression models take into account the phenomenon of regression toward the mean, but there are a number of concerns about the use of regression analysis.

Keogh (1988) suggests that regression models are superior to other models in ensuring comparability of numbers across grade levels and in better identifying students across a full range of ability scores. She cautions, however, that these models, like all other models, remain vulnerable to the false identification of normal children as having specific learning disabilities and the false identification of children with learning disabilities as normal.

For any given case, the definition of a severe discrepancy must be decided and a method of measuring it must be determined. In addition, a decision must be made about a cut off point; will a severe discrepancy be a 10 point difference or a 30 point difference? The interaction of these three factors

may contribute to the variance in populations with learning disabilities and influence the findings of research employing system-identified populations.

Subtest Scatter as a Measure of Discrepancy

Conceptualizing a severe discrepancy as either a difference between the Verbal and Performance IQ scores of the WISC-R, or a difference between the scaled scores of the specific subtests of the WISC-R (Rivers, Kavale & Smith, 1988) has promoted the search for a pattern of test scores that would separate the student with specific learning disabilities from other mildly disabled students. According to McKinney (1988), "one common characteristic associated with learning disabilities is an uneven pattern of abilities . . . The most popular application of the concept has been in the clinical interpretation of the Wechsler Intelligence Scales, and a variety of classification schemes have been devised to index learning disabilities" (p. 256).

Kavale and Forness (1984) conducted a meta-analysis of 94 studies to determine the validity of Wechsler scatter analysis and recategorization. Their major finding indicated that there was little evidence of a pattern that could be used to define the population with specific learning disabilities (cited in McKinney, 1988). In response, Ingles and Lawson (1987) contended " . . . that Kavale and Forness's failure to find any distinctive patterns for LD children . . . was not the result of an absence of such

patterns. Rather, the relevant patterns may not be discernible through the conventional methods they used" (p.202).

A study on the use of WISC-R subtest scores for identifying students with specific learning disabilities (Glutting & Bear, 1989) showed that discriminant-function analyses differentiated among subgroups of LD children. Children with significant aptitude-achievement discrepancies performed differently on subtests than LD children without a significant discrepancy. Perhaps the frustration with this approach for improving the identification of students with specific learning disabilities is summed up when the authors say, "these discriminations were meaningless for practical purposes. Classification analyses conducted subsequent to the discriminant-function analyses revealed that . . . subtest scores from the WISC-R were [not] capable of returning children to their correct groups" (p.297).

General School Failure and Learning Disabilities

Concerns exist over the extent to which students with specific learning disabilities differ from the population of children commonly called "low achievers". In a series of major investigations, "learning disabled students could not be differentiated psychometrically from low-achieving students" (Ysseldyke, Algozzine, Shinn, & McGue, 1982). "It can be argued that researchers employing school-labeled samples have been comparing normally achieving children to low achievers with mild IQ deficits (the mean

IQ of school-identified students with LD is close to 90)" (Graham & Harris, 1989, p. 501). ". . . [M]any students . . . identified as SLD have below-average intelligence, do not exhibit discrepancies between verbal and performance subtests . . . and do not have severe discrepancies between achievement and ability" (Rivers & Smith, 1988, p. 643). Chalfant (1985) suggested that, "The overidentification of underachievers helps explain why state and local educational agencies are urgently trying to find ways to document a discrepancy between achievement and aptitude" (p. 13).

In reporting findings from the National Longitudinal Transition study, Wagner summarized the IQ data as follows:

> . . . Although the mean IQ score for students in the category was in the average range (87), 6% of students classified as learning disabled had IQ scores of 70 or below, the range that would qualify a student as mentally retarded in most states. The majority of students had IQ scores from 71 to 90 (60%), with fewer than one-third of students having IQ scores higher than 90 (p. 6).

An analysis (Mann, Davis, Boyer, Metz, & Wolford, 1983, p. 15) of IQ criteria used by Child Service Demonstration Centers revealed little consistency. The following list emphasizes the fact that to talk about the "learning disabled" population across studies can mean talking about very divergent groups of individuals in each specific case.

IQ	Number of Projects
100 or above	1
90 or above	8
85 or above	8
Average IQ (undefined)	6
Not more than	1
Below 85	1
80 & above	12
70 & above	3
Not more that 2 SD	3
55 to 75	1
Not clearly identified	53

Kirk and Elkins (1975) studying the same population, 3,000 children enrolled in Child Service Demonstration Centers for the learning disabilities in 21 states, reported a mean IQ of 93 (cited in Piotrowske & Siegle, 1986). Given the distribution of scores and lack of specificity in identifying IQs, apparent in the list compiled by Mann, Davis, Boyer, Metz, & Woldford (1983), the value and meaning of a Mean IQ score obtained across this data can be questioned.

Table 2.1 lists studies that illustrate further the variability of mean IQ scores for students with specific learning disabilities. The lack of consensus on the meaning and measurement of intelligence, coupled with lack of precision in definition of learning disabilities, has created problems in interpreting learning disabilities research. If the wrong findings were general-

ized to the wrong populations, it would be possible to reach incorrect conclusions.

TABLE 2.1

Studies that Illustrate the Variability of Mean IQ Scores for Students with Learning Disabilities

Studies	Year	Initial Mean IQ	Mean IQ in 3 Years
Gottsman	1979	88	___
O'Shea & Valcante	1986	86.4	84.75
White & others	1984	83	80
White & Wigle	1986	83	89.2
Chapman	1988	99.7	___
Gajar	1980	93.3	___
Kavale & Nye	1985-86	96	___
Kistner & Gatlin	1989	99.95	___
Shapiro & Clausen	1985	97.32	___
Wilson, Cone, Bradley & Reese	1986	97.33	___
Rivers & Smith	1988	91.9-males 101.92-females	___

Summary

The impetus to remove mildly disabled students from special education rolls and return them to the province of general education has emerged from historical and current concerns. These concerns are raised in the context of equality and equity as they relate to a system of educational programming that relies on grouping children for the delivery of instruction.

Such grouping has been challenged both legally and educationally. Literature and research support the idea that there are strong links between the variables of race, special needs, and ability when they are used as criteria for placement in separate schools, classes, or handicapping categories. Legal decisions have determined that race, special needs, and ability are not appropriate determinates of grouping. Educational research has generally failed to support superior outcomes for students who are separated from their peers on the basis of ability or handicapping condition.

Heterogeneity and overlap in special education populations have made it difficult to determine the extent to which conclusions concerning the efficacy of special education programming applies to students with specific learning disabilities. Heterogeneity and overlap are directly related to the issue of intelligence, and its relationship to the definition of specific learning disabilities. The scarcity of long term studies with populations exhibiting specific learning disabilities adds to the confusion. The research that does exist indicates mixed outcome results both across studies and within studies.

CHAPTER III

METHODOLOGY

Population

The population for this study was comprised of all students with specific learning disabilities, grades seven through twelve, in a large school district in the State of Virginia, who received a triennial evaluation during the school year 1990-91. Grades seven through twelve were chosen to increase the probability that the students would have three sets of evaluation data spanning a six-year period. To obtain a sample, a list was compiled that included the names of the 1,458 students who had received a triennial evaluation during school-year 1990-91. Using this list, a record search was conducted to generate a second list that contained the names of all students who meet the criteria of three sets of standard evaluation data over a six-year period.

Standard evaluation data included: Wechsler intelligence measures, achievement as measured by the Woodcock-Johnson Part II, statement of the presence of a functional deficit, and a statement of percentage of time spent in general education. This criterion was applied to avoid three of the seven factors Kavale (1988) cited as contributing to conflicting findings in special education research. These factors are: (a) failure to provide sufficient data in original assessment which prevents systematic comparison; (b) failure to provide consistent data across subjects by relying

on whatever data are available; and (c) failure to provide equivalent data at different assessment points.

The record search resulted in a sample pool of 651, or approximately 45% of the original population. The final sample was selected by placing the names of all eligible students on slips of paper, and drawing out names randomly in accordance with a sample size selection table (Yamane, 1967) at a .01 confidence level. For a population of 700, the sample size needed to ensure this confidence level was 88 (+ or - 10%). The final sample for the study consisted of 103 students, thereby exceeding the requirements for this level of confidence.

The organizational arrangements of the school system used for the study included dividing the system into four separate administrative areas. Therefore, the special-service files for students are maintained in four different locations. In order to reflect the demographic characteristics of the sample, an effort was made to select students in proportion to their representation for ethnicity within each of the four administrative areas. The sample population (n=103) that resulted from this random sampling is displayed in Table 3.1, crosstabulated for ethnicity and sex.

Data Collection

A data collection form was designed to simplify the collection of information (See Appendix A). The following general information was

TABLE 3.1

FREQUENCY DISTRIBUTION OF SAMPLE POPULATION
(Sex by Ethnicity)

	ETHNICITY				
SEX	WHITE	BLACK	HISPANIC	ASIAN PACIFIC	TOTALS
MALE	49	8	5	2	64
FEMALE	27	8	3	1	39
TOTALS	76	16	8	3	103

collected: (a) student identification number; (b) demographic information including birth date, age, sex, and ethnicity; (c) school and area. Specific information relating to special education services was gathered for three separate times: (a) initial evaluation; (b) first triennial evaluation; (c) second triennial evaluation. Identical data was gathered for each evaluation period including: (a) date of evaluation; (b) handicapping condition; (c) functional deficit; (d) percentage of time spent in general education; (e) discrepancy used for determination of learning disability; (f) area(s) of academic underachievement; (g) Standard Age Scores from the WISC-R for Full Scale IQ, Performance IQ, and Verbal IQ; (h) Standard Age Scores from the Woodcock-Johnson Psycho-Educational Battery Part II tests of reading, mathematics, written language and knowledge. To ensure confidentiality, only the student identification number was recorded on the data collection form.

Research Hypotheses

The purpose of this study was to examine the achievement of students with specific learning disabilities over a six-year period, from time of initial evaluation to time of second triennial. The research hypotheses investigated were:

H_o^1 There will be no significant increase in achievement over a six-year period for all students classified as exhibiting a specific learning disability and manifesting a discrepancy between aptitude, as measured by the WISC-R Standard Scores, and achievement, as measured by Part II of the Woodcock-Johnson Psycho-Educational Battery Standard Scores.

H_o^2 There will be no significant increase in achievement over a six-year period for the group of students classified as exhibiting a specific learning disability and manifesting an aptitude achievement discrepancy between full scale IQ, as measured by the WISC-R Standard Score, and achievement, as measured by Part II of the Woodcock-Johnson Psycho-Educational Battery Standard Scores.

H_o^3 There will be no significant increase in achievement over a six-year period for the group of students classified as exhibiting a specific learning disability and manifesting an

aptitude achievement discrepancy between verbal IQ, as measured by the WISC-R Standard Score, and achievement, as measured by Part II of the Woodcock-Johnson Psycho-Educational Battery Standard Scores.

H_o^4 There will be no significant increase in achievement over a six-year period for the group of students classified as exhibiting a specific learning disability and manifesting an aptitude achievement discrepancy between performance IQ, as measured by the WISC-R Standard Score, and achievement, as measured by Part II of the Woodcock-Johnson Psycho-Educational Battery Standard Scores.

H_o^5 Controlling for aptitude there will be no significant relationship (individually or in combination) between achievement, as measured by Part II of the Woodcock-Johnson Psycho-Educational Battery Standard Scores and the following characteristics: (a) sex, (b) ethnicity, (c) area(s) of academic deficit, (d) type of functional deficit and (e) level of services received.

Data Analysis

Descriptive statistics were generated on the total population, and on each of the subsets of the population (i.e., the subgroup identified using a discrepancy between full-scale IQ and achievement as one factor, the

subgroup identified using a discrepancy between VIQ and achievement as one factor, and the subgroup identified using a discrepancy between PIQ and achievement as one factor). This grouping was necessary to gain some idea of the distributions of the variables, and their average values and dispersals (Norusis, 1985). However, the subgroup identified using a discrepancy between VIQ and achievement, as one factor, was too small (n=5) to be analyzed. Therefore, statistics were generated for only two groups at three test intervals. Crosstabs were used to determine the number of students comprising each group at each time of testing. Contingency tables (crosstabulation) were generated for all possible variable combinations having potential relationships to achievement (e.g., relationship of sex to identification based on full scale IQ or PIQ as one factor).

To test H_o^1, H_o^2, and H_o^4, one analysis was conducted to determine if differences existed between groups from time of initial testing to time of second triennial, or a period of six years. A second analysis was conducted to determine if there were changes across time from initial testing to first triennial to second triennial within each group.

To examine differences between the initial testing and the final testing, MANOVA Repeated Measures Design was used. The dependent variable was achievement and the independent variables were: the subgroup of students found eligible based on full scale IQ (n=74); and the subgroup of students found eligible based on performance IQ (n=24). A combination

of the Woodcock-Johnson subtest scores was used as the best representative construct of achievement. This score was created by combining the standard age scores for reading, mathematics, and written language, and dividing the total by three. Although IQ and achievement are usually highly correlated, there was a possibility that this might not be true due to population characteristics (underachievement based on ability). Therefore, IQ was used as covariate, and the residualized achievement was analyzed.

To examine patterns of achievement within each group over time, repeated measures analysis of variance was used to examine scores for each group at each test interval. The dependent variable remained achievement, but the independent variables were achievement scores at the initial testing and at the first triennial.

To test H_o^5, a MANOVA Repeated Measures Design was used to analyze the relationship between the dependent variable of achievement and combinations of independent variables (nominal variables of sex, ethnicity, area(s) of academic weakness, functional deficit, and level of placement) that had significant relationships (+ or -, $p<.05$) with the dependent variable (achievement).

A high number of empty cells, or cells containing fewer than 5 students, occurred for two of the variables: academic deficits and functional deficits (see Tables C.1 to C.16 in Appendix C). Therefore, it was not

possible to use them, individually or in combination, as independent variables. Individual analyses were run to determine whether or not there were significant relationships between the remaining independent variables of sex, ethnicity, and level of services with the dependent variable of achievement.

CHAPTER IV

ANALYSIS OF RESULTS

The purpose of this study was to examine the achievement of students with specific learning disabilities over a six-year period, from their initial placement in special education until their second triennial evaluation. The study proposed to look at changes in achievement for the entire sample labeled specific learning disabled and for three subgroups of this population. The subgroups were: (a) students whose criteria for classification as specific learning disabled included a discrepancy between achievement and their full scale IQ score; (b) students whose criteria for classification as specific learning disabled included a discrepancy between achievement and their verbal IQ score; (c) students whose criteria for classification as specific learning disabled included a discrepancy between achievement and their performance IQ score. It was impossible to analyze data for the second group, those students whose criteria for classification as specific learning disabled included a discrepancy between achievement and their verbal IQ score, because there were insufficient students in this group ($n=5$).

The study also examined relationships between achievement and the following nominal variables: (a) sex, (b) ethnicity, (c) area(s) of academic deficit, (d) type of processing disorder and (e) level of services received.

Descriptive statistics were generated for each of the three test intervals on the total population and on the two subsets of the population that could be analyzed (Full scale IQ group and PIQ group). Crosstabs was used to determine the number of students comprising each group at each time of testing. Contingency tables (crosstabulation) were generated for all possible variable combinations having potential relationships to achievement (e.g., relationship of sex to identification based on full scale IQ or PIQ).

The population for this study was comprised of all students with specific learning disabilities, grades seven through twelve, in a large school district in the State of Virginia, who received a triennial evaluation during the school year 1990-91 (n=1450). A record search was conducted to identify all students who met the criteria of three sets of standard evaluation data over a six-year period.

The record search resulted in a sample pool of 651, or approximately 45% of the original population. The final sample was selected by placing the names of all eligible students on slips of paper and drawing out names randomly in accordance with a sample size selection table (Yamane, 1967) at a .01 confidence level. For a population of 700 the sample size needed to ensure this confidence level was 88 (+ or - 10%). The final sample for the study consisted of 103 students, thereby exceeding the requirements for this level of confidence.

The mean IQ scores and achievement scores of the population, and of each subset of the population, are displayed in Tables 4.1. The mean IQ of the sample at each time of testing approximated 100.

Analysis of variance revealed that the Mean Full-scale IQ scores were significantly different ($F=7.224$, $p < .00$) between subgroups. The students, whose criteria for classification as specific learning disabled included a discrepancy between achievement and their full-scale IQ score, had a Mean Full-scale IQ of 102.28. The students, whose criteria for classification as specific learning disabled included a discrepancy between achievement and their performance IQ score, had a Mean Full-scale IQ of 94.88. Students, whose criteria for classification as specific learning disabled included a discrepancy between achievement and their verbal IQ score, comprised too small a group to draw meaningful conclusions. However, it is of interest to note that the mean IQ of this group was 86.00. When this group was added to the analysis of variance the significance of the difference among groups increased ($F=7.417$, $p < .00$).

A separate analysis of variance, examining initial levels of achievement, revealed moderately significant differences between the two subgroups ($F=3.945$, $p < .05$). The subgroup identified based on full-scale IQ had an average achievement mean of 88.87, while the performance subgroup had an average achievement mean of 84.65. Thus, the findings

TABLE 4.1

LONGITUDINAL MEAN TEST SCORES
for the full sample (n=103)

	Woodcock-Johnson Part II			WISC-R		
Test Period	Reading	Math	Written Language	Verbal	Perfor-mance	Full-Scale
Initial	85.47	89.61	86.86	97.00	102.86	99.77
1st Triennial	86.95	90.17	89.19	97.31	104.69	100.70
2nd Triennial	89.57	92.12	88.20	96.26	105.10	100.15

LONGITUDINAL MEAN TEST SCORES
for the sample group with a Full-Scale IQ - Achievement Discrepancy (n=74)

	Woodcock-Johnson Part II			WISC-R		
Test Period	Reading	Math	Written Language	Verbal	Perfor-mance	Full-Scale
Initial	86.14	91.28	87.54	99.97	104.18	102.28
1st Triennial	87.46	91.30	89.20	100.19	106.66	103.39
2nd Triennial	90.58	94.24	88.07	99.22	106.51	102.59

LONGITUDINAL MEAN TEST SCORES
for the sample group with a Performance IQ - Achievement Discrepancy (n=24)

	Woodcock-Johnson Part II			WISC-R		
Test Period	Reading	Math	Written Language	Verbal	Perfor-mance	Full-Scale
Initial	81.46	85.33	83.54	88.46	103.58	94.88
1st Triennial	84.21	86.92	87.17	88.08	103.88	95.04
2nd Triennial	85.63	87.08	87.33	86.71	105.42	94.79

suggest that, initially, the subgroup identified based on performance IQ had lower levels of both ability and achievement.

In examining the sample with regard to the question of discrepancy, data suggest that the full sample did not have a 15 point discrepancy between ability and achievement in any academic area at any time of testing (see Table 4.2).

Table 4.2

Discrepancy between Mean Full-Scale IQ Scores and Mean Achievement Scores for the Full Sample (n = 103)

Test Period	Reading	Mathematics	Written Language
Initial	14.3	10.16	12.91
1st Triennial	13.75	10.53	11.51
2nd Triennial	10.58	8.03	11.95

Examining the data for the subgroups, identified on the basis of a discrepancy between either full-scale IQ or performance IQ, revealed a different pattern. The subgroup identified using the full-scale IQ, was 15 or more points discrepant in reading at the initial and first triennial testing periods, but not at the second triennial. The group was never discrepant in mathematics and moderately deficient in written language at all three evaluation times. The subgroup, identified based on their performance IQ, was discrepant in all areas at all times of testing (see Tables 4.3 and 4.4).

Table 4.3

Discrepancy between Mean Full-Scale IQ Scores and Mean Achievement Scores for the Subgroup Identified Based on Full-Scale IQ (n=74)

Test Period	Reading	Mathematics	Written Language
Initial	16.14	11.00	14.74
1st Triennial	15.93	12.09	14.19
2nd Triennial	12.01	8.35	14.52

Table 4.4

Discrepancy between Mean Performance IQ Scores and Mean Achievement Scores for the Subgroup Identified Based on Performance IQ (n=24)

Test Period	Reading	Mathematics	Written Language
Initial	22.12	18.25	20.04
1st Triennial	19.67	16.96	16.71
2nd Triennial	19.79	18.34	18.09

The sample included 64 males (62.1%) and 39 females (37.9%). The ratio of males to females was somewhat lower that the 3 to 1 ratio often reported in the studies of students with specific learning disabilities (Mckinney & Feagans, 1984; Richardson, 1989). Analysis of variance revealed moderate differences between males and females on initial IQ levels ($F=7.224$, $p < .05$) and significant differences on initial achievement levels ($F=6.525$, $p < .01$). Both differences were in favor of males, who had

higher mean IQ and achievement scores, across the six-year period. This difference existed across ethnic groups (see Table 4.5).

Table 4.5

Longitudinal WISC-R Full-Scale IQ Scores
by Sex and Ethnicity

Ethnicity	Sex	Evaluation Sessions		
		Initial	1st Triennial	2nd Triennial
White	Females	95.37	95.22	93.15
	Males	101.16	102.12	101.76
Black	Females	88.75	87.88	84.13
	Males	93.75	93.50	89.63
Hispanic	Females	81.33	83.00	85.33
	Males	91.40	91.20	95.20

As illustrated by Table 4.6, the ethnic composition of the population was moderately different than that of the overall school population for the school year 1986-1987.

TABLE 4.6

Comparison of Percentages of Each Ethnic Group in the
Total School Population and in the Sample

ETHNICITY	Population	Sample
Asian	9.4%	2.9%
Black	9.5%	15.5%
Hispanic	4.6%	7.8%
White	76.2%	73.8%

Black and Hispanic students were overrepresented, while Asian students were underrepresented. This finding agrees with data suggesting that minorities are overrepresented in special education (Chinn & Hughes, 1987; Elliott, 1987; Heller, Holtzman, & Messick, 1982; Prillaman, 1973; Richardson, 1989; Tucker, 1980).

There were seven possible categories of academic deficit. Students could be found deficient in reading, written language, or mathematics, individually or in combination. Academic deficits across time are shown in Table 4.7.

TABLE 4.7

Number of Students Found Discrepant by Academic Area from Initial Evaluation to Second Triennial

Woodcock-Johnson Subtests	Initial Evaluation	First Triennial	Second Triennial
Reading	7	13	13
Mathematics	7	8	8
Written Language	10	11	18
Reading, Mathematics and Written Language	41	42	32
Reading and Written Language	28	18	19
Reading and Mathematics	6	7	10
Mathematics and Written Language	4	4	3

An initial attempt was made to code each functional deficit and each combination of functional deficits uniquely. However, many students in the sample had combinations of two or more functional deficits, and the attempt to code them uniquely by number resulted in more than thirty such identities. This total made it impossible to do any analysis by functional deficit, because there were too few instances of many combinations. Therefore, functional deficits were collapsed into seven categories. The deficit categories were: (a) visual motor integration; (b) auditory; (c) visual; (d) visual motor integration and auditory (a plus b); (e) visual motor integration and visual (a plus c); (f) auditory, visual, and visual motor integration (a plus b plus c); and, (g) visual and auditory (b plus c). Functional deficits across time are shown in Table 4.8.

TABLE 4.8

Number of Students in Each Functional Deficit Category from Initial Evaluation to Second Triennial

Functional Deficit	Initial Evaluation	First Triennial	Second Triennial
Visual Motor Integration (VMI)	23	30	28
Auditory	16	20	25
Visual	4	4	3
VMI/Auditory	40	29	31
VMI/Visual	5	5	4
VMI/Visual/Auditory	7	11	7
Visual/Auditory	5	4	5

Hypotheses H_o^1, H_o^2, H_o^3, and H_o^4 were concerned with measuring achievement outcomes, over a six-year period, for the overall sample population and for three subgroups of the population. H_o^1 addressed the entire sample population. H_o^2 addressed that portion of the population identified as having a specific learning disability based on a discrepancy between achievement, as measured by Part II of the Woodcock-Johnson Psycho-Educational Battery Standard Scores, and the full-scale score obtained on the WISC-R. H_o^3 addressed that portion of the population identified as having a specific learning disability based on a discrepancy between achievement, as measured by Part II of the Woodcock-Johnson Psycho-Educational Battery Standard Scores, and the verbal subtest score obtained on the WISC-R. H_o^4 addressed that portion of the population identified as having a specific learning disability based on a discrepancy between achievement, as measured by Part II of the Woodcock-Johnson Psycho-Educational Battery Standard Scores, and the performance subtest score obtained on the WISC-R.

In order to test these hypotheses, achievement was defined as a combination of the mean standard age scores obtained on the Woodcock-Johnson subtests of reading, mathematics, and written language at the second triennial testing. To acquire a single score to be used for this measure, the mean scores obtained were averaged. The resulting score represented an average achievement measure for the sample population. A

similar process was followed to determine achievement at the first triennial and at the time of initial evaluation, using the appropriate mean standard age scores on the Woodcock-Johnson subtests of reading, mathematics, and written language for the two testing intervals.

The resulting scores, for initial level of achievement, middle level of achievement, and final level of achievement, were covaried with the initial level of intelligence, as represented by the Full-Scale score obtained on the WISC-R. These scores were then analyzed using the SPSS^{x} statistical package, Multivariate Analysis of Variance, MANOVA, Repeated Measures Design.

In running a Repeated Measures Design, the original variables are transformed, so linear combinations of their differences are analyzed. The linear combinations are adjusted so that the sum of the squared coefficients is 1. In this model, a constant term that corresponds to the overall mean is formed. In analyzing the achievement of the sample over a six-year period, contrasts were made between linear combinations of the achievement scores for each test interval and the constant term (M. Norusis, 1985).

When a covariate is added to the equation, the regression between the dependent variable and the covariate is calculated. The MANOVA procedure requires that a covariate is specified for each variable under consideration. The covariate used, the Full-Scale WISC-R at initial testing, remained the same and was repeated for each level of the variable tested.

Hypotheses H_o^1

H_o^1 states that there will be no significant increase in achievement over a six-year period for all students classified as exhibiting a specific learning disability and manifesting a discrepancy between aptitude, as measured by the WISC-R Standard Scores, and achievement, as measured by Part II of the Woodcock-Johnson Psycho-Educational Battery Standard Scores.

MANOVA Repeated Measure Design produced several tests for the achievement effect: multivariate tests of significance, univariate F-tests, and averaged tests of significance. All statistics indicated that the full sample had made significant gains in achievement over the six-year period. Results are as follows: multivariate tests of significance $F=5.26466$, $p < .00$; univariate F-tests with (1,102) D. F. produced two contrasts: the first contrast between initial testing and first triennial, $F=5.12705$, $p < .02$, the second contrast between an average of initial testing and first triennial with second triennial, $F=8.32661$, $p < .00$; averaged tests of significance $F=6.68$, $p < .00$. The analysis resulted in a rejection of H_o^1 that states there will be no significant increase in achievement over a six-year period for the group of students classified as exhibiting a specific learning disability and manifesting an aptitude achievement discrepancy, as measured by the WISC-R Standard Scores, and achievement, as measured by Part II of the Woodcock-Johnson Psycho-Educational Battery Standard Scores.

Hypothesis H_o^2

This hypothesis states that there will be no significant increase in achievement over a six-year period for the group of students classified as exhibiting a specific learning disability and manifesting an aptitude achievement discrepancy between full scale IQ, as measured by the WISC-R Standard Scores, and achievement, as measured by Part II of the Woodcock-Johnson Psycho-Educational Battery Standard Scores.

MANOVA Repeated Measure Design produced several tests for the achievement effect: multivariate tests of significance, univariate F-tests, and averaged tests of significance. All statistics indicated that the subgroup, identified based on full-scale IQ, made significant gains in achievement over the six-year period. Results are as follows: multivariate tests of significance $F=4.85126$, $p < .01$; univariate F-tests with (1, 73) D. F. produced two contrasts: the first contrast between initial testing and first triennial, $F=6.94315$, $p < .01$, the second contrast between an average of initial testing and first triennial with second triennial, $F=5.42315$, $p < .02$; averaged tests of significance $F=6.18$, $p < .00$. This resulted in a rejection of the null hypothesis that there would no significant increase in achievement over a six-year period for the group of students classified as exhibiting a specific learning disability and manifesting an aptitude achievement discrepancy between verbal IQ, as measured by the WISC-R

Standard Scores, and achievement, as measured by Part II of the Woodcock-Johnson Psycho-Educational Battery Standard Scores.

Hypothesis H_o^3

This hypothesis states that there will be no significant increase in achievement over a six-year period for the group of students classified as exhibiting a specific learning disability and manifesting an aptitude achievement discrepancy between verbal IQ, as measured by the WISC-R Standard Scores, and achievement, as measured by Part II of the Woodcock-Johnson Psycho-Educational Battery Standard Scores.

This hypothesis could not be tested because the number of students fitting the criteria was too small (n = 5).

Hypothesis H_o^4

This hypothesis states that there will be no significant increase in achievement over a six-year period for the group of students classified as exhibiting a specific learning disability and manifesting an aptitude achievement discrepancy between performance IQ, as measured by the WISC-R Standard Scores, and achievement, as measured by Part II of the Woodcock-Johnson Psycho-Educational Battery Standard Scores.

MANOVA Repeated Measure Design produced several tests for the achievement effect: multivariate tests of significance, univariate F-tests, and averaged tests of significance. All statistics indicated the subgroup, identified based on a discrepancy between performance IQ and achievement,

did not make significant achievement gains across the six-year period. Results are as follows: multivariate tests of significance $F=1.99915$, $p < .15$; univariate F-tests with (1, 23) D. F. produced two contrasts: the first contrast between initial testing and first triennial, $F=0.29154$, $p < .59$, the second contrast between an average of initial testing and first triennial with second triennial, $F=4.17921$, $p < .05$; averaged tests of significance $F=2.05$, $p < .14$. This resulted in a failure to reject the null hypothesis that there would no significant increase in achievement over a six-year period for the group of students classified as exhibiting a specific learning disability and manifesting an aptitude achievement discrepancy between performance IQ, as measured by the WISC-R Standard Scores, and achievement, as measured by Part II of the Woodcock-Johnson Psycho-Educational Battery Standard Scores.

To test this hypothesis further, a MANOVA Repeated Designs was run to examine the relationship between achievement by group membership (full-scale group and performance group) and achievement. This analysis produced the following results: multivariate tests of significance $F=0.58381$, $p < .56$; averaged tests of significance $F=0.46$, $p < .63$. These statistics indicate that group membership has no significant effect on achievement, a finding that appears to contradict the previous findings. Two explanations seem possible. The first is that a type II error was made in accepting the null hypothesis for H_0^4. The other is that the number of

students in group two and group three are so unequal that the effect of the larger group (full-scale; n = 74) masks differences in the smaller group (performance; n = 24).

Hypothesis H_0^6

This hypothesis states that, controlling for aptitude, there will be no significant relationship (individually or in combination) between achievement, as measured by Part II of the Woodcock-Johnson Psycho-Educational Battery Standard Scores, and the following characteristics: (a) sex, (b) ethnicity, (c) area(s) of academic deficit, (d) type of functional deficit and (e) level of services received.

A high number of empty cells, or cells containing fewer than 5 students, occurred for two of the variables: academic deficits and functional deficits (see Tables C.1 to C.16 in Appendix C). Therefore, it was not possible to use them, individually or in combination, as independent variables. Individual analyses were run to determine whether or not there were significant relationships between the remaining independent variables of sex, ethnicity, and level of services with the dependent variable of achievement.

Separate tests were run using MANOVA Repeated Measures Design to analyze achievement by sex and by race. The following results were produced for the relationship between sex and achievement: multivariate tests of significance $F = 1.05097$, $p < .86$ univariate F-tests with (1, 101)

D. F. produced two contrasts: the first contrast between initial testing and first triennial, $F=0.29081$, $p < .59$, the second contrast between an average of initial testing and first triennial with second triennial, $F=0.00133$, $p < .97$; averaged tests of significance $F=6.56$, $p < .86$. All statistics suggest that there is not a significant relationship between sex and achievement for the sample population.

In analyzing the relationship between race and achievement, the three Asian students were not included because of their small number. The analysis was run using black, Hispanic and white students. The following results were produced for the relationship between race and achievement: multivariate tests of significance $F=0.05196$, $p < .99$; univariate F-tests with (2, 97) D. F. produced two contrasts: the first contrast between initial testing and first triennial, $F=0.07582$, $p < .92$, the second contrast between an average of initial testing and first triennial with second triennial, $F=0.05625$, $p < .94$; averaged tests of significance $F=3.35$, $p < .99$. All statistics suggest that there is not a significant relationship between race and achievement for the sample population.

The remaining independent variable, level of placement, was coded in two ways. First, an absolute percentage of time in general education was recorded. Second, a determination of placement was made based on the percentage of time; less than 51% of time in general education was considered a self-contained placement, more than 50% of time in general

education was considered a resource placement. Across time, a movement was noted toward more inclusion in general education for the full sample, and for the performance IQ group and the full-scale group. This trend is shown in Table 4.9.

TABLE 4.9

Mean Percentage of Time in General Education
from Initial Evaluation to Second Triennial

Group	Initial Evaluation	First Triennial	Second Triennial
Full Sample	62.48	63.82	70.30
Full-Scale Group	66.09	65.22	71.26
Performance Group	47.79	55.88	64.92

Analysis of variance ANOVA was used to examine relationships between placement (self-contained and resource), and intelligence and achievement. Placement and full-scale IQ, verbal IQ, and performance IQ were analyzed for each of the test periods. Achievement, as represented by the averaged achievement score, and placement were also analyzed for each of the test periods. Results are reported for each comparison at each test period.

At initial evaluation, the analysis of variance revealed main effects for the interaction between full-scale IQ and placement ($F=8.050$, $p < .00$), and the interaction between verbal IQ and placement ($F=16.70$, $p < .00$;). Mean full-scale and verbal IQ scores were significantly higher for students in

resource placements. Conversely, there was no main effect for the interaction between performance IQ and placement ($F=.387$, $p < .53$) indicating that performance IQs were not significantly different for resource and self-contained students. The analysis of variance revealed a main effect for the interaction between achievement and placement ($F=25.162$, $p < .00$); students in self-contained placements had significantly lower mean achievement scores.

At the first triennial testing, the analysis of variance continued to reveal main effects for the interaction between full-scale IQ and placement ($F=8.429$, $p < .00$), and the interaction between verbal IQ and placement ($F=14.579$ $p <.00$). Again, the students who were placed in resource programs had significantly higher mean full-scale and verbal IQs. There continued to be no effect for the interaction between performance IQ and placement ($F=1.936$, $p < .16$), indicating that there was not a significant difference between the performance IQs of the two groups. The main effect for the interaction between achievement and placement remained significant ($F=44.286$, $p < .00$); the students in self-contained placements had significantly lower mean achievement scores.

At the second triennial testing, the analysis of variance revealed significant main effects for all interactions involving intelligence (full-scale IQ and placement $F=14.475$, $p < .00$; verbal IQ and placement, $F=14.580$ $p <.00$; performance IQ and placement $F=7.797$, $p < .00$). This findings

suggests that, at the end of the six-year period, students in resource placements had significantly higher full-scale, verbal, and performance IQs. The main effect for the interaction between achievement and placement was also significant ($F = 44.286$, $p < .00$), indicating that the mean achievement score for students in resource placements was significantly higher than the mean achievement score for students in self-contained placements.

A BREAKDOWN procedure was run to further analyze the relationship between achievement, group membership (full-scale group, verbal group,

TABLE 4.10

Woodcock-Johnson Averaged Subtest Statistics
for the Three Subgroups of the Sample
by Placement across Three Evaluation Periods
(n = 103)

		Full Scale		Performance		Verbal	
		Mean	SD	Mean	SD	Mean	SD
Initial Evaluation	Self Contained	83.19	9.1	82.38	6.7	95.67	0.0
	Resource	92.00	8.2	88.44	8.3	92.33	8.0
First Triennial	Self Contained	81.82	9.1	83.11	5.4	93.33	0.0
	Resource	93.63	7.3	89.08	6.8	93.58	6.5
Second Triennial	Self Contained	81.71	11.5	81.71	6.1	-----	----
	Resource	93.12	9.1	89.17	4.9	90.93	4.5

and performance group), and placement. The results are displayed in table 4.10.

The mean achievement scores for the students in self-contained placements were lower than the mean achievement scores for the students in resource placements for each subgroup of the sample for each test period.

A BREAKDOWN procedure was run to further analyze the relationship between IQ, group membership (full-scale group, verbal group, and performance group), and placement. The results are displayed in table 4.11.

TABLE 4.11

WISC-R Full-Scale IQ Score Statistics
for the Three Subgroups of the Sample
by Placement across the Three Evaluation Periods
(n = 103)

		Full Scale		Performance		Verbal	
		Mean	SD	Mean	SD	Mean	SD
Initial Evaluation	Self Contained	96.96	10.6	94.73	10.9	80.00	0.0
	Resource	105.17	12.3	95.11	7.9	87.53	7.2
First Triennial	Self Contained	98.00	15.1	93.50	8.9	89.00	0.0
	Resource	106.49	9.4	96.58	10.1	87.75	5.1
Second Triennial	Self Contained	92.00	15.0	92.25	6.6	-----	----
	Resource	105.07	10.2	96.06	9.4	89.60	4.4

The mean IQ scores for the students in self-contained placements were lower than the mean IQ scores for the students in resource placements for each subgroup of the sample for each test period.

Summary

The results of the study follow in summary form. The sample population consisted of 103 students with specific learning disabilities (64 males and 39 females). The sample was divided into subgroups based on the intelligence measure used to establish a discrepancy between ability and achievement. This resulted in three subgroups: one group ($n = 74$) found discrepant from full-scale IQ; one group ($n = 24$) found discrepant from performance IQ; and one group ($n = 5$) found discrepant from verbal IQ. The group found discrepant from verbal IQ was too small to make meaningful statistical analyses and, therefore, was used only in the descriptive reports, and in the analysis of achievement over the six-year period for all students.

Analysis of variance revealed a significant difference ($p < .00$) existed between the group of students whose criteria for classification as specific learning disabled included a discrepancy between achievement and their full-scale IQ score, and the students whose criteria for classification as specific learning disabled included a discrepancy between achievement and performance IQ score. Moderate differences were noted between males and females on initial IQ levels ($p < .05$), and significant differences on initial achievement levels ($p < .01$).

The ethnic breakdown of the population was moderately different from that of the overall school population. Black and Hispanic students were overrepresented, whereas Asian and white students were underrepresented.

Achievement was defined as the average of the mean standard age scores on the Woodcock-Johnson subtests of reading, mathematics, and written language. Achievement was computed for the initial evaluation, the first triennial, and for the second triennial test periods. Achievement was analyzed for the full sample, and for two subgroups of the sample (the performance subgroup with n = 74, and the full-scale subgroup with n = 24).

Analyses for achievement, resulting from Repeated Measures Analysis of Variance, with initial full-scale IQ as a covariate, showed that the full sample made significant gains over a six-year period ($p < .00$). Similar results were shown for the group (n = 74) classified using a discrepancy between full-scale IQ and achievement ($p < .01$). The group (n = 24) classified using a discrepancy between performance IQ and achievement did not make significant gains ($p < .15$).

The relationship of the nominal variables, sex and race, to achievement were analyzed. The variables were tested separately; neither nominal variable showed a significant relationship to achievement (sex, $p < .86$; race, $p < .99$).

Analysis of variance was used to examine relationships between placement (self-contained and resource), and intelligence and achievement for each evaluation period. For all three test periods, there was a significant relationship between full-scale IQ (p <.00,) and verbal IQ (p < .00) and achievement. The first two test periods did not reveal a significant relationship between performance IQ and achievement (p < .53; p < .16). The final test period revealed a significant relationship between performance IQ and achievement (p < .00). There was a significant relationship between placement and achievement at all three evaluation periods (p < .00).

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The purpose of this study was to examine the achievement of students with specific learning disabilities over a six-year period, from their initial placement in special education until their second triennial evaluation. The study examined changes in achievement, for the entire sample labeled as having specific learning disabilities, and for three subgroups of this population.

The subgroups were: (a) students whose criteria for classification as having specific learning disabilities included a discrepancy between achievement and their full scale IQ score; (b) students whose criteria for classification as having specific learning disabilities included a discrepancy between achievement and their verbal IQ score; and (c) students whose criteria for classification as having specific learning disabilities included a discrepancy between achievement and their performance IQ score. In addition, the study examined relationships between achievement and the following nominal variables: (a) sex, (b) ethnicity, (c) area(s) of academic deficit, (d) type of functional deficit, and (e) level of services received.

Review of the Literature

A review of the literature relating to students with specific learning disabilities revealed question regarding service delivery, population

characteristics and program results. Service delivery questions were at the center of the debate over the General Education Initiative introduced by Madeleine Will at the Wingspread Conference in 1985 (Baker & Zigmond, 1990; Bilken & Zollers, 1986; Carnine & Kameenui, 1990; McKinney & Hocutt, 1988; Schulte, Osborne & McKinney, 1990). Questions concerning population characteristics in studies of students with specific learning disabilities stemmed from both inadequate descriptions of students studied (Keogh et al., 1982), and the low intelligence levels reported in many studies of students with specific learning disabilities (Graham & Harris, 1989; Wagner, 1990; Mann et al., 1983; White & Wigle, 1983). Outcome issues included sparse longitudinal data (Kavale, 1988; Keogh, Major-Kingsley, Omori-Gordon, & Reid, 1982; McKinney & Feagans, 1984), and mixed results from the longitudinal studies that are available (McKinney, 1989; McKinney & Feagans, 1984; Wagner, 1990; White, 1984; White & Wigle, 1989).

Based on previous findings, two factors were identified as important concerns in research on populations with learning disabilities: (a) the effect of special education programs on achievement over time, and (b) the importance of providing a complete description of the population so meaningful comparisons and conclusions can be drawn from research.

Research Methodology

The sample population consisted of 103 students with specific learning disabilities (64 males and 39 females). The sample was divided into subgroups based on the intelligence measure used to establish a discrepancy between ability and achievement. This resulted in three subgroups: one group (n = 74) found discrepant from full-scale IQ; one group (n = 24) found discrepant from performance IQ; and one group (n = 5) found discrepant from verbal IQ. The group found discrepant from verbal IQ was too small to be used as a separate group in statistical analyses and, therefore, was included only in the descriptive statistics and the whole sample analyses.

The design of the study was an ex post facto paradigm that tested the general hypothesis that there would be no significant change in achievement for the overall sample, or for any subset of the sample. In addition, it was hypothesized that there would be no significant relationship between achievement and the variables of sex, ethnicity, academic deficit, functional deficit, or level of placement.

Analysis of variance, repeated measures design, was used to examine the achievement of the sample and of two subgroups of the sample. Achievement was defined as the average of the mean standard age scores on the Woodcock-Johnson subtests of reading, mathematics, and written language. Achievement was computed for the initial evaluation, the first triennial, and for the second triennial test periods. Achievement was

analyzed for the full sample and for two subgroups of the sample (groups n=74, and n=24).

Major Findings

1. The full sample of students with specific learning disabilities made significant gains in achievement over the six-year period of the study.
2. The subgroup of the sample, identified based on a discrepancy between full-scale IQ and achievement, made significant gains in achievement over the six-year period of the study.
3. The subgroup of the sample, identified based on a discrepancy between performance IQ and achievement, did not make significant gains in achievement over the six-year period examined.
4. There were significant differences, in both ability and achievement, between the subgroup identified based on full-scale IQ and the group identified based on performance IQ. The full-scale subgroup scored higher on both measures.
5. There were moderate differences in ability scores, and significant differences in achievement scores, between males and females in the study. Males scored higher on both measures.

6. There was not a significant relationship between gains in achievement and the nominal variables of sex and ethnicity. Although both females and minorities had lower achievement scores they made comparable progress.
7. There were significant relationships between IQ and achievement, and placement in self-contained and resource programs. Students in self-contained placements had lower IQ and achievement levels.
8. Black and Hispanic students were overrepresented in the sample whereas Asians were underrepresented.
9. Males were overrepresented in the sample whereas females were underrepresented.

Conclusions

Findings related to H_o^1 and H_o^2 appear to run counter to some research findings reported in the efficacy literature (McKinney,1989; McKinney & Feagans, 1984; White et al., 1984). Rather than showing a declining pattern of achievement over time, the data revealed that both groups significantly improved their achievement during the six-year period under study. In the current study, reading and mathematics showed consistent improvement during the six-year period. Written language showed improvement during the first three-year period then declined, but not to a level below that found initially. The findings of this study are more

consistent with previous efficacy research that showed achievement gains for students with specific learning disabilities in special education programs (Carlberg & Kavale, 1980; Marsten, 1987-1988; Schulte, Osborne, McKinney, 1990).

Differences in achievement gains, reported in the efficacy literature, may be related to differences in the students comprising the samples. The mean IQ for the sample in the White study was 83, which is significantly below the mean IQ of 100 reported for the sample in the current study. It is possible that students with higher IQs make significant progress in programs for students with specific learning disabilities, and students with lower IQs do not.

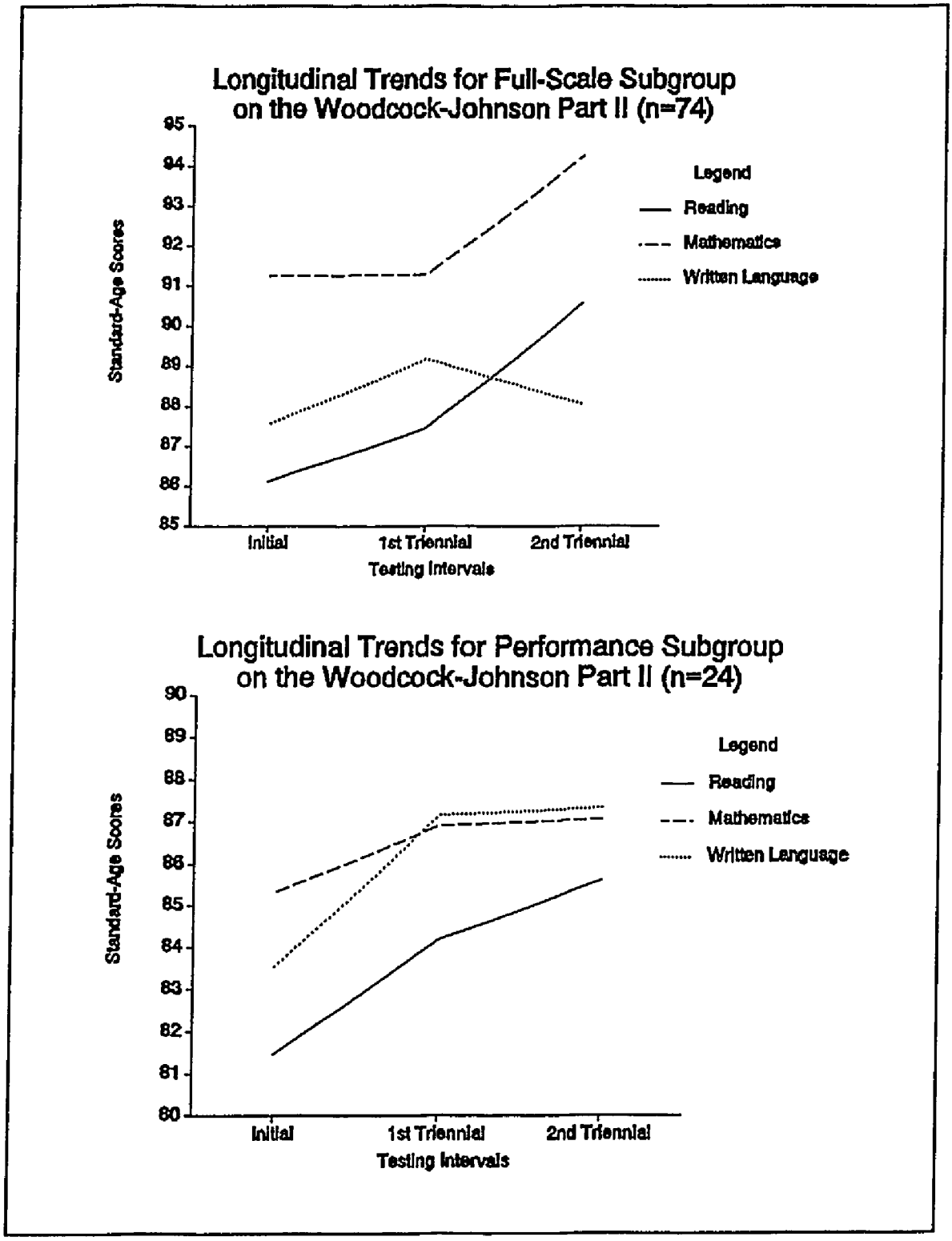
Findings related to H_0^3 do not appear to be addressed in the literature. The subgroup of students identified based on a discrepancy between verbal IQ and achievement formed too small a group ($n=5$) to be analyzed statistically. Two explanations seem possible. The first is that the number of students in the subgroup is rare, and the sample is reflecting that fact. The second is that these students make sufficient progress in the first three years they receive special education services to make additional services unnecessary. In the second instance, this subgroup would not appear in longitudinal studies that exceeded a three year period.

Findings related to H_0^4 appear consistent with efficacy studies that report no significant gains in achievement for students with specific learning

disabilities. It is of interest to note, however, that while the achievement for this group did not show statistical significance, gains were made over the six-year period of this study. For a comparison between the achievement gains, for the group identified based on full-scale IQ and the group identified on performance IQ, (see Table 5.1).

The graphs suggest that the groups have a different pattern of achievement over time. The subgroup identified based on full-scale IQ show the largest achievement gains, in reading and mathematics, in the second three years of the study. The group made gains in written language during the first three years but lost most of those gains in the second three-year period. In contrast, the subgroup identified based on performance IQ showed greater gains in all three academic areas in the first three years of the study. While they continued to make slight gains in reading, their performance in mathematics and written language remained steady during the second three-year period. Findings indicate that this subgroup of the population had lower IQ and achievement scores throughout the six year period, and failed to make significant gains. This is interesting in light of the belief that a verbal < performance discrepancy pattern is indicative of specific learning disabilities (Inglis & Lawson, 1987).

The question of disproportionate representation in special education programs, related to both sex and ethnicity, has been widely researched. In 1989, Richardson used data collected by the Office of Civil Rights,


Longitudinal Trends for Full-Scale Subgroup
on the Woodcock-Johnson Part II (n=74)
Standard-Age Scores
95
94
93
92
91
90
89
88
87
86
85
Initial
1st Triennial
2nd Triennial
Testing Intervals
Legend
Reading
Mathematics
Written Language
Longitudinal Trends for Performance Subgroup
on the Woodcock-Johnson Part II (n=24)
Standard-Age Scores
90
89
88
87
86
85
84
83
82
81
80
Initial
1st Triennial
2nd Triennial
Testing Intervals
Legend
Reading
Mathematics
Written Language

Department of Education, covering the years 1968-1984, to examine this issue. Two of Richardson's major findings are supported by data from this study. He found that: (a) "White students are not significantly overrepresented in LD programs at the national or state levels, and in some regions black students are minimally overrepresented" (p. 78); and (b) "Males are overrepresented in LD programs in ratios varying between 2:1 and 3:1 depending on location" (p. 79). The findings reported by Richardson (1989), and supported in this study, may indicate that Hallahan (1977) and Tucker (1980) were correct in suggesting that specific learning disabilities is replacing mild mental retardation as the placement choice for minorities.

In the current study, females had lower IQ and achievement scores regardless of ethnicity. Previous research on females, in programs for students with specific learning disabilities, both supports and contradicts these findings. In 1988, Rivers and Smith reported IQs for students with specific learning disabilities which showed males (Mean IQ 91.9) to be lower in ability than females (Mean IQ 101.92). The current study found the opposite distribution of IQ scores; regardless of ethnicity, females scored lower than males throughout the six-year period. However, in 1984, Hassett and Gurian found that girls were experiencing more academic problems than boys, but fewer were receiving services in LD programs. This

appears congruent with the profile presented by the females in the present sample.

A 1983 study (Ysseldyke, Christenson, Pianta, & Algozzine) examined teachers' reasons for referring students for assessment. While learning-related reasons accounted for the largest percent of referrals (39.9%), emotional and behavior problems accounted for 28.8% of the referrals. Females may be underrepresented in the population of students with specific learning disabilities generally, and in this study specifically, because they cause fewer problems in the classroom.

Attempts to analyze relationships between areas of academic deficit and achievement, singly or in combination with other nominal variables, was not possible due to the number of cells containing five, or fewer, students. Had such an analysis been possible, it might have revealed different results for achievement. It is possible that students with a single deficit area made progress in that academic area, but experienced losses in academic areas that were not specifically remediated. Achievement gains that occurred in single areas would not appear in the current study.

An examination of the information available on academic deficits reveals that the majority of students were discrepant in two or more academic areas at all three testing periods. While there was a movement toward fewer deficit areas, the movement was not substantial. Twenty-four

students had a single area of academic weakness at initial testing and thirty-nine students had a single deficit area six years later.

Reading and written language, singly or in combination, were identified as areas of weakness, for more students, than was mathematics. This may be a reflection of the impact reading and writing difficulties have on other academic areas as students progress through their school careers. Mathematics may actually present fewer problems for students, or the impact of any existing problems may be ameliorated by avoiding advanced mathematics classes at the high school level. It would be of interest to note if this pattern continues to exist in the face of reforms calling for an increase in the number of mathematics courses required for high school graduation. It is possible, that as the requirement for advanced mathematics courses increases, the number of students with specific learning disabilities in math will also increase.

The problem of a functional, or processing, deficit has received attention because of difficulties involved in operationalizing the concept (Bryan, 1989; Siegle, 1989). An initial attempt was made to code each functional deficit and each combination of functional deficits uniquely. However, many students in the sample had combinations of two or more functional deficits, and the attempt to code them uniquely by number resulted in more than thirty such identities. This total made it impossible to do any analysis by functional deficit, because there were too few instances

of many combinations. Therefore functional deficits were collapsed into seven categories.

Data from this study indicate that approximately 79% of the sample had functional deficits that related to visual motor integration (VMI), or were auditory in nature; VMI and auditory deficits often occurred in combination. Deficits in the visual motor area were based on information from the Bender-Gestalt Test or the Beery Test of Visual Motor Integration, while auditory problems were related to performance on the digit recitation subtests of either the WISC-R or the Woodcock-Johnson Part I. It is possible that identified functional deficits are more a reflection of the tests available to measure them, than they are a reflection of problems that do, or do not, exist in students.

Unlike many previous studies (see Table 2.1), the sample in the current study had a full-scale mean IQ closely approximating 100 points throughout the six-year period. The presence of a mean IQ approximating 100 might suggest that the sample is comprised of students who meet the traditional conceptualization of students with specific learning disabilities and do not represent a group of "low achieving" students. However, the ability level of the entire population is considerably higher than average (mean percentile score on the Cognitive Abilities Test in all three areas is 74). Therefore, this study may support the view that students with specific learning disabilities represent ". . . average learners in above-average school

systems" (Shepard, Smith, & Vojir, 1983). It is also possible that the use of a standard score discrepancy model resulted in higher IQs since one limitation of this model is its tendency to overidentify students with high IQs and underidentify students with lower IQs.

The findings relative to placement, indicated that students who were placed in self-contained, rather than resource, programs were a more debilitated group. The mean IQ and achievement scores for the self-contained students were lower at all three evaluation periods. This suggests that placement decisions were linked to student characteristics; needier students received more intensive services.

The question can be raised as to what these findings contribute to our understanding of the efficacy of special education services for students with specific learning disabilities. While the students in the sample made statistically significant gains over the six years examined in the study, what do those gains represent? Across subgroups and academic areas, the gains in standard scores never reached five points. When these standard score changes are translated into percentiles points the gains can be viewed from a different perspective. The smallest gain, a less than one percentile point gain, occurred in the area of written language for the full-scale subgroup. The greatest gain, nine percentile points, occurred for the same group in the area of reading.

These gains still leave the students scoring between the sixteenth and the thirtith percentiles, considerably below the achievement range that could be predicted from the mean IQ score of approximately 100. Thus this study appears to offer both hope and caution. Unlike other studies that have shown students with specific learning disabilities falling increasingly behind their peers, this study indicates that these students have maintained their relative position or made slight gains. Caution is indicated because the study appears to support the belief that specific learning disabilities are pervasive, long-term disabilities without simple remediations.

Recommendations for Future Research

Serious limitations, to the study of the efficacy of special education programs for students with specific learning disabilities, arise from the retrospective examination of achievement and the lack of control groups against which achievement can be measured. Both legal and ethical factors contribute to these limitations. It is illegal to deny special education services to students who have been declared eligible to receive them. If it were not illegal, one would hope that the ethical dilemma presented by such a decision would still prevent most educators from designing a study that deprived a group of students of needed services for the purposes of educational research.

As a way to compensate for both limitations, it is recommended that future research include a control group chosen from a pool of students who

were referred, and received a psychoeducational evaluation, but were found ineligible for placement in any special education program. Individual records could be examined to determine the reason(s) an individual student was found ineligible and selections made based on this data. Possible choices might include students who met all criteria except a functional deficit, or students who missed the discrepancy criteria by the smallest margin. These students would have initial evaluation data comparable to students who were found eligible for placement and comparisons could be made at yearly intervals. While this would not be a perfect control group it would be an improvement over having none.

Future research should be designed to examine longitudinal achievement in reading, mathematics, and written language individually. It is possible that such research would reveal achievement gains that differed from those in the current study. In addition, such research might yield insights into the patterns of achievement evidenced in this study. Of particular interest is the initial gain, followed by a loss, in written language experienced by the subgroup identified based on full-scale IQ, and the leveling off of achievement experienced by the subgroup idendified based on performance IQ.

The issue of overrepresentation of minorities in programs for students with specific learning disabilities should continue to receive attention. While

the trend has been documented, and speculation as to its causes has resulted, research has not been conducted yet to explain its occurrence.

Further research should be conducted to determine if the pattern of functional deficits documented in this study is a common pattern. If it is, then the continued inclusion of functional deficits as a requirement for specific learning disabilities should be examined. The concept of a processing deficit may be intellectually attractive, but if it cannot be operationalized, or if only those deficits for which educators have a test can be documented, it is of little usefulness, and may be detrimental, in determining which students receive services and which do not.

Future research should be conducted on the concept of discrepancy. In the present study, the overall sample did not demonstrate a significant 15 point discrepancy, between ability and achievement in any academic area, at any time of testing. However, subgroups of the sample that had been found eligible for services, based on differing IQ measures (i.e. full-scale score or performance score), were found to have significant 15 point discrepancies between ability and achievement, in one or more academic areas, at all three test intervals. It would be of interest to see if this was an isolated finding or if it would occur in other instances.

APPENDIX A

Data Collection Form

THE EFFICACY OF SPECIAL EDUCATION SERVICES FOR STUDENTS WITH LEARNING DISABILITIES

STUDENT ID NUMBER:_____ BIRTH DATE:_____
SEX:_____ ETHNICITY:_____
SCHOOL:_____ AREA:_____

INITIAL EVALUATION DATE:_____

Handicapping Condition:_____
Functional Deficit:_____
Area(s) of Academic Deficit:_____
Placement:_____% of Time in General Education:_____
One condition of placement was a discrepancy between_____IQ and Achievement in:_____
Age:_____

WISC-R
Standard Scores (SS)
Verbal_____
Performance_____
Full Scale_____

WOODCOCK-JOHNSON, Part II
Standard Scores (SS)
Reading_____
Mathematics_____
Written Language_____
Knowledge_____

FIRST TRIENNIAL DATE:_____

Handicapping Condition:_____
Functional Deficit(s):_____
Area(s) of Academic Deficit:_____
Placement:_____% of Time in General Education:_____
One condition of placement was a discrepancy between_____IQ and Achievement in:_____
Age:_____

WISC-R
Standard Scores (SS)
Verbal_____
Performance_____
Full Scale_____

WOODCOCK-JOHNSON, Part II
Standard Scores (SS)
Reading_____
Mathematics_____
Written Language_____
Knowledge_____

SECOND TRIENNIAL DATE: _____

Handicapping Condition: _____
Functional Deficit(s): _____
Area(s) of Academic Deficit: _____
Placement: _____ % of Time in General Education: _____
One condition of placement was a discrepancy between _____ IQ and
Achievement in: _____
Age: _____

WISC-R
Standard Scores (SS)

Verbal _____
Performance _____
Full Scale _____

WOODCOCK-JOHNSON, Part II
Standard Scores (SS)

Reading _____
Mathematics _____
Written Language _____
Knowledge _____

THIRD TRIENNIAL DATE: _____ (If conducted.)

Handicapping Condition: _____
Functional Deficit(s): _____
Area(s) of Academic Deficit: _____
Placement: _____ % of Time in General Education: _____
One condition of placement was a discrepancy between _____ IQ and
Achievement in: _____
Age: _____

WISC-R
Standard Scores (SS)

Verbal _____
Performance _____
Full Scale _____

WOODCOCK-JOHNSON, Part II
Standard Scores (SS)

Reading _____
Mathematics _____
Written Language _____
Knowledge _____

APPENDIX B

Group Means, Group Standard Deviations, and Group Ranges
on the Woodcock Johnson Part II
and
on the Wechsler Intelligence Test for Children
for the Three Evaluation Periods

TABLE B.1

Group Means, Group Standard Deviations, and Group Ranges
on the Woodcock Johnson Part II
for the Three Evaluation Periods
(n = 103)

	Mean of Sample	Standard Deviation	Range	
			Min.	Max.
Initial Evaluation:				
Reading	85.47	10.32	61.0	110.0
Mathematics	89.61	13.75	62.0	131.0
Written Language	86.86	10.29	65.0	115.0
First Triennial Evaluation				
Reading	86.95	10.03	68.0	112.0
Mathematics	90.17	13.56	49.0	126.0
Written Language	89.19	9.55	63.0	120.0
Second Triennial Evaluation				
Reading	89.57	11.08	56.0	121.0
Mathematics	92.12	14.52	50.0	125.0
Written Language	88.20	8.74	62.0	113.0

TABLE B.2

Group Means, Group Standard Deviations, and Group Ranges on the Wechsler Intelligence Test for Children - Revised for the Three Evaluation Periods (n = 103)

	Mean of Sample	Standard Deviation	Range	
			Min.	Max.
Initial Evaluation:				
Verbal	97.00	12.52	70.0	131.0
Performance	102.86	13.58	60.0	133.0
Full Scale	99.77	12.29	74.0	129.0
First Triennial Evaluation				
Verbal	97.31	12.03	67.0	127.0
Performance	104.69	14.39	65.0	135.0
Full Scale	100.70	12.33	69.0	129.0
Second Triennial Evaluation				
Verbal	96.26	11.45	72.0	133.0
Performance	105.10	13.97	72.0	136.0
Full Scale	100.15	11.91	72.0	128.0

APPENDIX C

Mean Scores on the Wechsler Intelligence Scale for Children and the Woodcock Johnson Psycho-Educational Battery - Part II in Relation to Areas of Functional Deficit, Areas of Academic Deficit, and Ethnicity

TABLE C.1

Mean Scores on the Wechsler Intelligence Scale for Children-Revised
for
Areas of Functional Deficit
by Ethnicity = White (n=76)

Key: ** =empty cell F=female M=male	Verbal						Performance						Full-Scale					
	Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial	
Processing Deficit:	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
1 Visual motor integration (VMI)	108	103	93	106	94	107	112	100	102	105	104	111	111	101	96	106	99	109
2 Auditory	102	94	97	101	96	100	115	111	116	114	112	118	108	101	106	108	104	108
3 Visual	105	97	**	98	**	97	104	95	**	106	**	101	104	96	**	101	**	99
4 VMI & Auditory (1 & 2)	91	99	101	100	90	97	100	106	108	107	104	105	95	102	104	103	97	101
5 VMI & Visual (1 & 3)	90	108	**	111	102	102	70	106	**	102	103	105	78	108	**	109	102	104
6 Auditory, Visual & Visual Motor(1-3)	81	103	92	100	88	94	87	108	86	102	79	82	83	106	89	101	82	87
7 Visual & Auditory (2 & 3)	**	98	92	95	90	104	**	103	108	93	112	112	**	99	99	93	100	108

TABLE C.2

Mean Scores on the Wechsler Intelligence Scale for Children-Revised
for
Areas of Functional Deficit
by Ethnicity = Black (16)

Key: **=empty cell F=female M=male	Verbal						Performance						Full-Scale					
	Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial	
Processing Deficit:	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
1 Visual motor integration (VMI)	91	87	89	100	88	112	96	80	95	112	88	112	93	82	91	105	88	112
2 Auditory	**	**	85	113	86	92	**	**	106	112	86	92	**	**	94	114	86	92
3 Visual	**	**	**	**	84	**	**	**	**	**	84	**	**	**	**	**	84	**
4 VMI & Auditory (1 & 2)	82	93	84	93	**	91	94	107	94	92	**	91	87	100	90	92	**	91
5 VMI & Visual (1 & 3)	**	**	**	81	**	**	**	**	**	95	**	**	**	**	**	87	**	**
6 Auditory, Visual & Visual Motor(1-3)	**	**	**	81	**	92	**	**	**	121	**	92	**	**	**	99	**	92
7 Visual & Auditory (2 & 3)	101	103	96	**	**	**	85	92	98	**	**	**	92	98	96	**	**	**

TABLE C.3

Mean Scores on the Wechsler Intelligence Scale for Children-Revised
for
Areas of Functional Deficit
by Ethnicity = Hispanic (n=8)

Key:
** =empty cell
F=female
M=male

	Verbal						Performance						Full-Scale					
	Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial	
Processing Deficit:	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
1 Visual motor integration (VMI)	**	94	**	86	**	102	**	100	**	101	**	**	**	100	**	92	**	102
2 Auditory	**	**	87	97	90	102	**	**	105	115	90	101	**	**	95	106	90	102
3 Visual	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
4 VMI & Auditory (1 & 2)	80	93	81	**	94	**	96	98	99	**	94	109	85	95	89	**	94	**
5 VMI & Visual (1 & 3)	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
6 Auditory, Visual & Visual Motor(1-3)	**	**	**	90	**	96	**	**	**	106	**	**	**	**	**	97	**	98
7 Visual & Auditory (2 & 3)	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**

TABLE C.4

Mean Scores on the Wechsler Intelligence Scale for Children-Revised
for
Areas of Functional Deficit
by Ethnicity = Asian (n=3)

Key:
** = empty cell
F = female
M = male

	Verbal						Performance						Full-Scale					
	Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial	
Processing Deficit:	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
1 Visual motor integration (VMI)	102	**	**	**	**	**	108	**	**	**	**	**	105	**	**	**	**	**
2 Auditory	**	98	**	**	**	106	**	105	115	115	**	96	**	108	**	109	**	101
3 Visual	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
4 VMI & Auditory (1 & 2)	**	**	**	101	88	98	**	**	**	**	115	120	**	**	**	**	101	109
5 VMI & Visual (1 & 3)	**	**	90	**	**	**	**	**	**	**	**	**	**	**	91	**	**	**
6 Auditory, Visual & Visual Motor(1-3)	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
7 Visual & Auditory (2 & 3)	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**

TABLE C.5

Mean Scores on the Wechsler Intelligence Scale for Children-Revised
for
Areas of Academic Deficit
by Ethnicity = White (n=76)

Key:
** = empty cell
F = female
M = male

	Verbal						Performance						Full-Scale					
	Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial	
Academic Deficit:	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
1 Reading	102	107	93	104	90	97	105	102	111	98	105	107	103	104	100	101	97	101
2 Mathematics	**	94	84	98	82	101	**	91	78	91	85	97	**	91	80	94	82	96
3 Written Language	81	97	103	105	100	106	88	95	120	112	115	109	82	95	112	109	107	108
4 Reading/Math/ Written Language	99	107	99	95	94	95	108	109	110	109	104	114	104	105	104	101	98	103
5 Reading/ Written Language	93	105	84	108	92	106	105	108	99	108	90	110	98	106	90	109	90	108
6 Reading/Math	87	100	92	103	91	101	88	116	87	128	106	108	86	108	88	117	99	104
7 Math/ Written Language	**	97	**	104	111	104	**	97	**	95	107	106	**	96	**	101	110	105

TABLE C.6

Mean Scores on the Wechsler Intelligence Scale for Children-Revised
for
Areas of Academic Deficit
by Ethnicity = Black (n=16)

Key: ** = empty cell F = female M = male	Verbal						Performance						Full-Scale					
	Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial	
Academic Deficit:	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
1 Reading	**	87	**	81	101	107	**	80	**	95	92	104	**	82	**	87	96	105
2 Mathematics	101	**	96	**	81	**	85	**	98	**	89	**	92	**	96	**	84	**
3 Written Language	96	**	98	**	**	**	88	**	88	**	**	**	92	**	92	**	**	**
4 Reading/Math/ Written Language	85	97	85	91	82	86	100	109	100	101	96	95	91	103	91	95	88	89
5 Reading/ Written Language	87	93	86	100	**	90	92	92	101	112	**	104	89	92	96	105	**	96
6 Reading/Math	**	92	82	111	84	78	**	112	86	98	87	95	**	101	83	105	84	85
7 Math/ Written Language	85	**	**	**	**	**	95	**	**	**	**	**	89	**	**	**	**	**

TABLE C.7

Mean Scores on the Wechsler Intelligence Scale for Children-Revised
for
Areas of Academic Deficit
by Ethnicity = Hispanic (n=8)

Key:
** = empty cell
F = female
M = male

	Verbal						Performance						Full-Scale					
	Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial	
Academic Deficit:	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
1 Reading	**	**	95	85	80	**	**	**	98	98	98	**	**	**	96	90	87	**
2 Mathematics	**	**	**	90	**	**	**	**	**	106	**	**	**	**	**	97	**	**
3 Written Language	**	88	**	96	**	87	**	92	**	101	**	105	**	97	**	99	**	95
4 Reading/Math/ Written Language	80	94	87	98	90	96	103	115	105	128	93	106	89	103	95	112	92	100
5 Reading/ Written Language	**	100	**	**	86	**	**	108	**	**	105	**	**	103	**	**	94	**
6 Reading/Math	85	**	67	87	**	101	85	**	100	104	**	106	84	**	81	94	**	103
7 Math/ Written Language	**	82	**	**	**	**	**	92	**	**	**	**	**	86	**	**	**	**

TABLE C.8

Mean Scores on the Wechsler Intelligence Scale for Children-Revised
for
Areas of Academic Deficit
by Ethnicity = Asian (n=3)

Key:
** = empty cell
F = female
M = male

	Verbal						Performance						Full-Scale					
	Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial	
Academic Deficit:	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
1 Reading	**	93	**	**	**	**	**	87	**	**	**	**	**	102	**	**	**	**
2 Mathematics	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
3 Written Language	**	**	**	**	**	98	**	**	**	**	**	120	**	**	**	**	**	109
4 Reading/Math/ Written Language	108	**	**	101	88	106	108	**	**	115	115	96	105	**	**	109	101	101
5 Reading/ Written Language	**	103	90	**	**	**	**	123	95	**	**	**	**	113	91	**	**	**
6 Reading/Math	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
7 Math/ Written Language	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**

TABLE C.9

Mean Scores on the Woodcock-Johnson Psycho-Educational Part II
for
Areas of Functional Deficit
by Ethnicity = White (n=76)

Key: ** = empty cell F = female M = male	Reading						Mathematics						Written Language					
	Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial	
Processing deficit:	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
1 Visual motor integration (VMI)	80	90	82	92	88	98	82	96	85	102	92	102	82	91	85	92	83	89
2 Auditory	91	91	88	98	91	94	93	85	98	98	98	103	93	90	98	93	98	92
3 Visual	88	85	**	81	**	86	100	89	**	86	**	99	95	82	**	87	**	86
4 VMI & Auditory (1 & 2)	80	92	91	87	85	88	85	92	84	91	87	92	82	91	89	91	83	87
5 VMI & Visual (1 & 3)	69	86	**	99	86	108	78	97	**	95	94	105	76	89	**	87	95	93
6 Auditory, Visual & Visual Motor(1-3)	82	87	77	91	88	99	79	99	76	93	76	77	77	92	87	94	84	102
7 Visual & Auditory (2 & 3)	**	86	83	101	87	94	**	86	84	94	92	84	**	88	88	93	93	90

TABLE C.10

Mean Scores on the Woodcock-Johnson Psycho-Educational Part II
for
Areas of Functional Deficit
by Ethnicity = Black (n=16)

Key:
** =empty cell
F=female
M=male

	Reading						Mathematics						Written Language					
	Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial	
Processing Deficit:	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
1 Visual motor integration (VMI)	77	69	80	82	80	82	87	81	84	100	80	82	84	78	80	78	80	82
2 Auditory	**	**	69	85	90	85	**	**	80	87	90	85	**	**	82	88	90	85
3 Visual	**	**	**	**	84	**	**	**	**	**	84	**	**	**	**	**	84	**
4 VMI & Auditory (1 & 2)	76	79	78	81	**	83	76	87	81	81	**	83	80	81	85	84	**	83
5 VMI & Visual (1 & 3)	**	**	**	69	**	**	**	**	**	80	**	**	**	**	**	80	**	**
6 Auditory, Visual & Visual Motor(1-3)	**	**	**	78	**	75	**	**	**	89	**	75	**	**	**	79	**	75
7 Visual & Auditory (2 & 3)	97	80	100	**	**	**	81	87	95	**	**	**	102	80	106	**	**	**

TABLE C.11

Mean Scores on the Woodcock-Johnson Psycho-Educational Part II
for
Areas of Functional Deficit
by Ethnicity = Hispanic (n=8)

Key:
** = empty cell
F = female
M = male

	Reading						Mathematics						Written Language					
	Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial	
Processing Deficit:	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
1 Visual motor integration	**	84	**	82	**	**	90	**	85	85	**	83	**	83	**	87	**	82
2 Auditory	**	**	82	88	90	**	**	85	89	89	75	91	**	**	80	88	90	91
3 Visual	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
4 VMI & Auditory (1 & 2)	80	89	82	**	92	79	79	85	**	**	98	**	84	83	89	**	92	**
5 VMI & Visual (1 & 3)	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
6 Auditory, Visual & Visual Motor(1-3)	**	**	**	84	**	**	**	**	82	86	**	80	**	**	**	92	**	91
7 Visual & Auditory (2 & 3)	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**

TABLE C.12

Mean Scores on the Woodcock-Johnson Psycho-Educational Part II
for
Areas of Functional Deficit
by Ethnicity = Asian (n=3)

Key:
** =empty cell
F=female
M=male

	Reading						Mathematics						Written Language					
	Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial	
Processing Deficit:	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
1 Visual motor integration	75	**	**	**	**	**	87	**	**	**	**	**	72	**	**	**	**	**
2 Auditory	**	83	**	89	**	82	**	95	**	91	**	77	**	82	**	94	**	88
3 Visual	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
4 VMI & Auditory (1 & 2)	**	**	**	**	82	101	**	**	**	**	82	107	**	**	**	**	77	93
5 VMI & Visual (1 & 3)	**	**	85	**	**	**	**	**	78	**	**	**	**	**	81	**	**	**
6 Auditory, Visual & Visual Motor(1-3)	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
7 Visual & Auditory (2 & 3)	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**

TABLE C.13

Mean Scores on the Woodcock-Johnson Psycho-Educational Part II
for
Areas of Academic Deficit
by Ethnicity = White (n=76)

Key: ** = empty cell F = female M = male	Reading						Mathematics						Written Language					
	Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial	
Academic Deficit:	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
1 Reading	87	90	86	88	82	89	100	107	100	105	95	102	97	100	96	98	95	92
2 Mathematics	**	94	86	103	93	99	**	77	68	81	75	92	**	89	88	104	97	99
3 Written Language	72	95	103	97	100	105	76	96	108	103	115	105	77	93	100	96	88	92
4 Reading/Math/ Written Language	85	84	84	84	86	85	87	86	86	85	82	83	87	86	88	86	82	83
5 Reading/ Written Language	84	87	77	90	83	90	92	103	89	104	88	105	84	90	85	90	86	85
6 Reading/Math	86	103	86	75	87	91	78	105	77	75	89	88	88	101	82	63	95	91
7 Math/ Written Language	**	96	**	100	102	98	**	85	**	90	109	87	**	91	**	92	92	101

TABLE C.14

Mean Scores on the Woodcock-Johnson Psycho-Educational Part II
for
Areas of Academic Deficit
by Ethnicity = Black (n=16)

Key:
** = empty cell
F = female
M = male

	Reading						Mathematics						Written Language					
	Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial	
Academic Deficit:	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
1 Reading	**	69	**	69	83	89	**	81	**	80	89	96	**	78	**	80	91	89
2 Mathematics	97	**	100	**	89	**	81	**	95	**	81	**	102	**	106	**	90	**
3 Written Language	85	**	85	**	**	**	90	**	99	**	**	**	89	**	88	**	**	**
4 Reading/Math/ Written Language	73	83	76	80	76	77	81	88	80	83	77	85	77	83	79	81	80	79
5 Reading/ Written Language	77	73	87	82	**	85	83	80	103	100	**	92	83	76	96	78	**	83
6 Reading/Math	**	77	69	85	75	81	**	98	58	88	84	79	**	84	73	97	81	82
7 Math/ Written Language	84	**	**	**	**	**	78	**	**	**	**	**	87	**	**	**	**	**

TABLE C.15

Mean Scores on the Woodcock-Johnson Psycho-Educational Part II
for
Areas of Academic Deficit
by Ethnicity = Hispanic (n=8)

Key:
** =empty cell
F=female
M=male

	Reading						Mathematics						Written Language					
	Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial	
Academic Deficit:	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
1 Reading	**	**	82	80	82	**	**	**	90	87	85	**	**	**	87	84	93	**
2 Mathematics	**	**	**	84	**	**	**	**	**	82	**	**	**	**	**	92	**	**
3 Written Language	**	83	**	88	**	87	**	87	**	88	**	95	**	82	**	85	**	92
4 Reading/Math/ Written Language	73	87	82	88	84	86	78	83	70	89	80	80	80	80	80	91	87	87
5 Reading/ Written Language	**	84	**	**	95	**	**	92	**	**	**	**	**	84	**	**	92	**
6 Reading/Math	87	**	82	84	**	87	80	**	79	83	90	90	84	**	90	90	**	92
7 Math/ Written Language	**	93	**	**	**	**	**	74	**	**	**	**	**	87	**	**	**	**

TABLE C.16

Mean Scores on the Woodcock-Johnson Psycho-Educational Part II
for
Areas of Academic Deficit
by Ethnicity = Asian (n=3)

Key:
** =empty cell
F=female
M=male

	Reading						Mathematics						Written Language					
	Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial		Initial		First Triennial		Second Triennial	
Academic Deficit:	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
1 Reading	**	77	**	**	**	**	**	102	**	**	**	**	**	84	**	**	**	**
2 Mathematics	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
3 Written Language	**	**	**	**	**	101	**	**	**	**	**	107	**	**	**	**	**	93
4 Reading/Math/ Written Language	75	**	**	89	82	82	87	**	**	91	82	77	72	**	**	94	77	88
5 Reading/ Written Language	**	89	85	**	**	**	**	87	78	**	**	**	**	80	81	**	**	**
6 Reading/Math	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
7 Math/ Written Language	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**

References

References

Affleck, J., Madge, S., Adams, A. & Lowenbraun, S. (1988). Integrated classroom versus resource model: Academic viability and effectiveness. Exceptional Children, 54(4). 339-348.

Alexander, K. (1980). School Law. St. Paul, Minnesota: West Publishing Company.

Algozzine, B. & Korinek, L. (1985). Where is special education for students with high prevalence handicaps going? Exceptional Children, 51, 388-394.

Algozzine, B., & Maheady, L. (1986). Exceptional Children, April, 487-488.

Baker, J., & Zigmond, N. (1990). Are regular education classes equipped to accommodate students with learning disabilities? Exceptional Children, 56(6), 515-526.

Bender, L. A. (1938). Visual notor gestalt test and its clinical use. New York: American Orthopsychiatric Association Research Monograhp No. 3.

Biklen, D., & Zollers, N. (1986). The focus of advocacy in the LD field. Journal of Learning Disabilities, 19(10), 579-586.

Blatt, B. (1987). The Conquest of Mental Retardation. Austin, Texas: PRO-ED, Inc.

Brown v. Board of Education, 347 U.S. 483 (1954)

Bryan, T. (1989). IQ and learning disabilities; A perspective from research on social factors. Journal of Learning Disabilities, 22(8), 480-481.

Bryan, T., Bay. M., & Donahue, M. (1988). Implications of the learning disabilities definition for the regular education initiative, Journal of Learning Disabilities, 21(1), 23-28.

Carlberg, C. & Kavale, K. (1980). The efficacy of special verssus regular class placement for exceptional children: A meta-analysis. The Journal of Special Education, 14(3), 295-309.

Carnine, D. W. & Kameenui, E. J. (1990). The general education initiative and children with special needs: A false dilemma in the face of true problems. Journal of Learning Disabilities, 23(3), 141-144.

Chalfant, J. C. (1985). Identifying learning disabled students: A summary of the national task force report. Learning Disabilities Focus, 1(1), 9-20.

Chapman, J. W. (1988). Cognitive-motivational characteristics and academic achievement of learning disabled children: A longitudinal study. Journal of Educational Psychology, 80(3), 357-365.

Clampit, M. & Silver, S. (1990). Demographic characteristics and mean profiles of learning disability index subsets of the standardization sample of the Wechsler Intelligence Scale for Children Revised. Journal of Learning Disabilities, 23(4), 263-264.

Cone, T. E. & Wilson, W. R. (1981). Quantifying a severe discrepancy: A critical analysis. Learning Disability Quarterly, 4, 359-371.

Council for Exceptional Children. (1986). A statement by the teacher education division council for exceptional children on the regular education initiative.

Diana v. State Board of Education, Civil Action No. C70 37RFP (N.D. Cal. January 7, 1970 and June 18, 1973).

Dixon, V. & Greenburg, D. (1984-85). Assessment in special education: Administrators' perspectives. Diagnostique, 10(14), 161-175.

Elliott, R. (1987). Litigating Intelligence. Dover, Massachusetts: Auburn House Publishing Company.

Esposito, D. (1973). Homogeneous and heterogeneous ability grouping: Principal findings and implications for evaluating and designing more effective educational environments. Review of Educational Research, 43(2), 219-222.

Fairfax County Public Schools (1990). Evaluation, eligibility, placement,and dismissal procrdures for special education programs. Fairfax, VA: Department of Student Services and Special Education

Findley, W. G. & Bryan, M. M. (1975). The Pros and Cons of Ability Grouping. Bloomington, Indiana: The Phi Delta Kappa Educational Foundation.

Froman, R. D. (1981). Ability grouping: Why do we persist and should we. (Report No. TM 810 173). Los Angeles, California: Paper presented at the 65th Annual Meeting of the American Educational Research Association. (ERIC Document No. ED 200 617).

Gajar, A. (1980). Characteristics across exceptional categories: EMR. LD, and ED. The Journal of Special Education, 14(2). 165-173.

Gallagher, J. J. (1986). Learning disabilities and special education: A critique. Journal of Learning Disabilities, 19(10), 595-601.

Gersten, R. & Woodward, J. (1990). Rethinking the regular education initiative: Focus on the classroom teacher. Remedial and Special Education, 11(3), 7-16.

Glass, G. V. (1983). Effectiveness of special education. Policy Studies Review, 2(Special # 1), 65-80.

Glutting, J. J. & Bear, G. G. (1989). Comparative efficacy of K-ABC subtests ve. WISC-R subtests in the differential classification of learning disabilities. Learning Disability Quarterly. 12, 291-298.

Gove, P. B. (1981). Webster's Third New International Dictionary Unabridged. Springfield, Massachusetts: G. & C. Merriam Company.

Graham, S. & Harris, K. (1989). The relevance of IQ in the determination of learning disabilities: Abandoning scores as decision makers. Journal of Learning Disabilities, 22(8), 500-503.

Green, T. F. (1983). Excellence, Equity, and Equality. In Schulman, L. S. & Sykes, G. (eds.), Handbook of Teaching and Policy. New York, New York: Longman Inc.

Grossman, H. J. (1973, 1977). Manual on Terminology and Classifaction in Mental Retardation. Special Publication (No. 2), Washington DC: American Association on Mental Deficiency.

Hallahan, D. & Kauffman, J. (1977). Labels, categories, behaviors: ED, LD, and EMR reconsidered. Journal of Learning Disabilities, 11(2), 139-149.

Hallahan, D., Kauffman, J., Lloyd, J. & McKinney, J. (1988). Introduction to the series: Questions about the regular education initiative. Journal of Learning Disabilities, 21(1), 3-5.

Hallahan, D., Keller, C., McKinney, J., Lloyd, J. & Bryan, T. (1988). Examining the research base of the regular education initiative: efficacy studies and the adaptive learning environments model. Journal of Learning Disabilities, 21(1), 29-35.

Hammill, D. (1990). On defining learning disabilities: An emerging consensus. Journal of Learning Disabilities, 23(2), 74-84.

Harris, B. (1988-89). 2001: The world our students will enter. The College Board Review, 150, (Winter), 20-24 & 34.

Hassett, I. D. & Gurian, A. (184, August). The learning disabled girl: A profile. Paper presented at the convention of the American Psychological Association, Toronto, Canada.

Heber, R. F. (1959, 1961). A manual on terminology and classification in mental retardation. American Journal of Mental Deficiency, (Monograph supplement)

Heller, K., Holtzman, W. & Messic, S. (Eds.) (1982). Placing Children in Special Education: A Strategy for Equity. National Academy Press: Washington, D.C.

Hobson v. Hanson, 267 F. Supp. 401, 320 F. Supp. 409, 320 F. Supp. 720, 327 F. Supp. 844, 44 FRD 18 (1968).

Inglis, J. & Lawson, J.S. (1987). Reanalysis of a meta-analysis of the validity of the Wechsler scales in the diagnosis of learning disability. Learning Disability Quarterly, 10, 198-202.

Jenkins, J. R., Pious, C. G. & Jewell, M. (1990). Special education and the regular education initiative: Basic assumptions. Exceptional Children, 56(6), 479-491.

Kauffman, J. M., Gerber, M. M. & Semmel, M. I. (1988). Arguable assumptions underlying the regular education initiative. Journal of Learning Disabilities, 21(1), 6-11.

Kavale, K. A. (1988). The long-term consequences of learning disabilities. In M. Wang, M. Reynolds, and H. Walberg (eds.), Handbook of Special Education: Research and Practice, Vol. 2, Mildly Handicapped Conditions. Oxford, England: Pergamon Press.

Kavale, K. A. & Forness, S. R. (1984). A meta-analysis of the validity of Wechsler scale profiles and recategorizations: Patterns or parodies? Learning Disability Quarterly, 7, 135-156.

Kavale, K. A. & Nye, C. (1985-86). Parameters of learning disabilities in achievement, linguistic, neuropsychological and social/behavioral domains. The Journal of Special Education, 19(4), 443-458.

Keogh, B. K. (1988). Improving services for problem learners: Rethinking and restructuring. Journal of Learning Disabilities, 21(1), 19-22.

Keogh, B., Major-Kingsley, S., Omori-Gordon, H. & Reid, H. (1982). A System of Marker Variables for the Field of Learning Disabilities. Syracuse, NY: Syracuse University Press.

Kistner, J. A. & Gatlin, D. (1989). Correlates of peer rejection among children with learning disabilities. Learning Disability Quarterly, 12, 133-140.

Kulick, C. C. & Kulick, J. A. (1982). Effects of ability grouping on secondary school students: A meta-analysis of evaluation findings. American Educational Research Journal, 19(3), 415-428.

Larry P. v. Riles, 343 F. Supp. 1306 (N. D. Cal. 1986).

Liberman, L. M. (1985). Special education and regular education: A merger made in heaven? Exceptional Children, 51(6), 513-516

Licht, B. G., Kistner, J. A., Ozkaragoz, T., Shapiro, S. & Clausen, L. (1985). Causal attributions of learning disabled children: Individual differences and their implications for persistence. Journal of Educational Psychology, 77(2), 208-216.

Lilly, M. S. (1986). The relationship between general and special education: A new face on and old issue. Counterpoint, 6(1), 10.

Lipsky, D. K. & Gartner, A. (1989). In Beyond Separate Education Quality Education for All. Lipsky, D. K, & Gartner, A. (Eds.). Baltimore MD: Paulh Brooks Publishing

MacMillan, D., Meyers, C. E. & Morrison, G. (1980). System-identification of mildly mentally retarded children: implications for interpreting and conducting research. American Journal of Mental Deficiency, 85(2), 108-115.

Madden, N. & Slavin, R. (1983). Mainstreaming students with mild handicaps: Academic and social outcomes. Review of Educational Research, 53(4), 519-569.

Mann, L., Davis, C., Boyer, C. W., Metz, C. M. & Woldford, B. (1983). LD or not LD, that was not the question: A retrospective analysis of child service demonstration centers' compliance with the federal definition of learning disabilities. Journal of Learning Disabilities, 16(1), 14-17.

Marston, D. (1987-1988). The effectiveness of special education: a time series analysis of reading performance in regular and special education settings. The Journal of Special Education, 21(21), 13-26.

McKinney, J. D. (1989). Longitudinal research on the behavioral characteristics of children with learning disabilities. Journal of Learning Disabilities, 22(3), 141-150.

McKinney, J. D. (1988) Research on Conceptually and empirically derived subtypes of specific learning disabilities. In M. Wang, M. Reynolds, and H. Walberg (eds.), Handbook of Special Education: Research and Practice Vol. 2, Mildly Handicapped Conditions. Oxford, England: Pergamon Press.

McKinney, J. D. & Feagans, L. (1984). Academic and behavioral characteristics of learning disabled children and average achievers: Longitudinal studies. Learning Disability Quarterly, 7, (Summer), 251-264.

McKinney, J. D. & Hocutt, A. M. (1988). The need for policy analysis in evaluating the regular education initiative. Journal of Learning Disabilities, 21(1), 12-18.

O,Shea, L. & Valcante, G. (1986). A comparison over time of relative discrepancy scores of low achievers. Exceptional Children, 53, (53), 253-259.

PARC, Bowman, et al., v. Commonwealth of Pennsylvania, 334 F. Supp. 279 (1971).

Piotrowske, R. J. & Siegle, D. J. (1986). The IQ of learning disability samples: A reexamination. Journal of Lerning Disabilities, 19(8), 492-493.

Prillaman, F. D. (1973). A Critical Analysis of Placement Factors in Primary and Intermediate Classes for the Educable Mentally Retarded in Virginia Public Schools. Unpublished doctoral dissertation, George Washington University.

Raze, N. (1984). Overview of research on ability grouping (Report No. EA 017 414). Redwood City, California: San Mateo County Office of Education. (ERIC Reproduction Service No. ED 252 927)

Reynolds, M. C. (1984). Classification of students with handicaps. In Gordon, E. W. (ed.). AERA Review of Research in Education, 11. Washington D.C.: AERA

Richardson, R. F. (1989). An Analysis of the Relationship between Race and Gender and National Student Placement in Programs for the Educable Mentally Retarded, Learning Disabled, and Seriously Emotionally Disturbed from 1976 through 1984. Unpublished doctoral dissertation, The College of William and Mary.

Rivers, D. & Smith, T. (1988). Traditional eligibility criteria for identifying students as specific learning disabled. Journal of Learning Disabilities, 21(10), 642-643.

Schulte, A., Osborne, S., & McKinney, J. (1990). Academic outcomes for students with learning disabilities in consultation and resource programs. Exceptional Children, (October/November), 162-171.

Semmel, M. I. & Gerber, M. M. (1990). If at first you don't succeed, bye, bye again: A response to general educators' views on the REI. Remedial and Special Education, 11(4), 53-59.

Shepard, L. A., Smith, L. A. & Vojir, C. P. (1983). Characteristics of pupils identified as learning disabled. Journal of Special Education, 16, 73-85.

Shoemaker, J. B. & Deshler, D. D. (1988). Implementing the regular education initiative in secondary schools: A different ball game. Journal of Learning Disabilities, 21(1), 36-42.

Siegel, L. (1989). IQ is irrelevant to the definition of learning disabilities. Journal of Learning Disabilities, 22(8), 469-478.

Skrtic, T. (1987). An organizational analysis of special education reform. The National Enquiry: Into The Future of Education for Students with Special Needs. Lawerence KA: The University of Kansas.

Slavin, R. (1987). Ability grouping and student achievement in elementary schools: A best-evidence synthesis. Review of Educational Research, 57(3), 293-336.

Smith, D., Lyon, M., Hunter, E. & Boyd, R. (1988). Relationship between the K-ABC and WISC-R for students referred for severe learning disabilities. Journal of Learning Disabilities, 21(8), 509-512.

Stanovich, K. (1989). Has the learning disabilities field lost its intelligence? Journal of Learning Disabilities, 22(8), 487-492.

Teacher Education Division of the Council for Exceptional Children. (1986, October). Message to all TED members concerning The National Inquiry into the Future of Education for Students with Special Needs. Reston, VA: Author

Tindal, G. (1985). Investigating the effectiveness of special education: An analysis of methodology. Journal of Learning Disabilities, 18(2), 101-112.

Torgesen, J. K. (1989). Why IQ is relevant to the definition of learning disabilities. Journal of Learning Disabilities, 22(8), 484-486.

Tucker, J. A. (1980). Ethnic proportions in classes for the learning disabled: Issues in nonbiased assessment. The Journal of Special Education, 14, 93-105.

United States Department of Education (1987). "To assure the free appropriate public education of all handicapped children". Ninth Annual Report to Congress on the Implementation of the Education of the Handicapped Act.

United States Department of Education (1991). "To assure the free appropriate public education of all children with disabilities". Thirteenth Annual Report to Congress on the Implementation of the Education of the Individuals With Disabilities Act.

United States Office of Education. (1977). Definition and criteria for defining students as learning disabled. Federal Register, 42:250, p. 65083. Washington, DC: U.S. Government Printing Office.

Vergason, G. A. & Anderegg, M. L. (1991). Beyond the regular education initiative and the resource room controversy. Focus on Exceptional Children, 23(7), 1-10.

Wiederholt, J. L. (1989). Restructuring special education services: The past,l the present, the future. Learning Disability Quarterlt, 12(3), 181-191.

Wagner, M. (1990). The school programs and school performance of secondary students classified as learning disabled: Findings from the national longitudinal transition study of special education students. Prepared for presentation to Division G, American Educational Research Association annual meetings, Boston, Massachusetts, April 1990.

Wang, M. C. & BaKer, E. T. (1985-86). Mainstreaming programs: Design features and effects. The Journal of Special Education, 19(4), 503-521.

Warner, M. M., Schumaker, J. B., Alley, G. R. & Deshler, D. D. (1980). Learning disabled adolescents: Are they different from other low-achievers? Exceptional Education Quarterly, 1(2), 27-36.

Wechsler, D. (1974). Wechsler Intelligence Scale for Children - Revised. New York, NY: The Psychological Corporation.

White, W. J. & Wigle, S. E. (1986). Patterns of Discrepancy over time as revealed by a standard-score comparison formula. Learning Disabilities Research, 2(1), 14-20.

White, W. J. et al. (1984). An examination of variability in identification of learning disabled students according to selected discrepancy formulas over a three year period. Kansas State Univ., Manhattan. (ED/OSERS Grant No. G008300023)

Will, M. (1986). Educating children with learning problems: A shared responsibility. Exceptional Children, February, 411-415.

Wilson, L., Cone, T., Bradley, C. & Reese, J. (1986). the characteristics of learning disabled and other handicapped students referred for evaluation in the state of Iowa. Journal of Learning Disabilities, 19(9), 553-557.

Wong, B. (1989). Is IQ necessary in the definition of learning disabilities? Introduction to the problem. Journal of Learning Disabilities, 22(8), 468.

Wood, T.A., Buckhalt, J. A. & Tomlin, J. G. (1988). Journal of Learning Disabilities, 21(8), 493-496.

Woodcock, R. W. & Johnson, M. B. (1977). Woodcock-Johnson Psycho-Educational Battery. Boston, MA: Teaching Resources Corporation.

Yates, A. (ed.) (1966). Grouping in Education. New York, London, Sydney: John Wiley & Sons; Stockholm: Almqvist & Wiksell.

Ysseldyke, J. E. (1988). Classification of handicapped students. In M. Wang, M. Reynolds, and H. Walberg (eds.), Handbook of Special Education: Research and Practice, Vol. 2, Mildly Handicapped Conditions. Oxford, England: Pergamon Press.

Ysseldyke, J. & Algozzine, B. (1984). Introduction to special education. Boston, MA: Houghton Mifflin.

Ysseldyke, J., Algozzine, B. & Epps, S. (1983). A logical and empirical analysis of current practice in classifying students as handicapped. Exceptional Children, 50(2), 160-166.

Ysseldyke, J., Algozzine, B., Shinn, M. & McGue, M. (1982). Similarities and differences between low achievers and students classified learning disabled. Journal of Special Education, 16, 73-85.

Ysseldyke, J., Christenson, S., Pianta, B. & Algozzine, B. (1983). An analysis of teachers' reasons and desired outcomes for students referred for psychoeducational assessment. Address reprint requests to James E. Ysseldyke. 350 Elliott Hall, 75 E. River Road, University of Minnesota, Minneapolis, MN 55455. Grune & Stratton, Inc.

ABSTRACT
THE EFFICACY OF SPECIAL EDUCATION SERVICES
FOR STUDENTS WITH SPECIFIC LEARNING DISABILITIES
A Longitudinal Study

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The College of William and Mary in Virginia, April 1992

Chairman: Dr. F. Douglas Prillaman

The purpose of this study was to examine the achievement of students with specific learning disabilities over a six-year period, from their initial placement in special education until their second triennial evaluation.

The study proposed to look at changes in achievement for the entire sample (n = 103) labeled specific learning disabled, and for three subgroups of this population. The subgroups were: (a) students whose criteria for classification as specific learning disabled included a discrepancy between achievement and their full scale IQ score (n = 74); (b) students whose criteria for classification as specific learning disabled included a discrepancy between achievement and their verbal IQ score (n = 5); and (c) students whose criteria for classification as specific learning disabled included a discrepancy between achievement and their performance IQ score (n = 24). The study also examined relationships between achievement and the following nominal variables: (a) sex, (b) ethnicity, (c) area(s) of academic deficit, (d) type of processing disorder and (e) level of services received.

The major Findings of this study were: 1) The full sample of students with specific learning disabilities made significant gains in achievement over the six-year period of the study. 2) The subgroup of the sample, identified based on a discrepancy between full-scale IQ and achievement, made significant gains in achievement over the six-year period of the study. 3) The subgroup of the sample, identified based on a discrepancy between performance IQ and achievement, did not make significant gains in achievement over the six-year period examined. 4) There were significant differences, in both ability and achievement, between the subgroup identified based on full-scale IQ and the group identified based on performance IQ. The full-scale subgroup scored higher on both measures. 5) There were moderate differences in measured ability levels, and significant differences in measured achievement levels, between males and females in the study. Males scored higher on both measures. 6) There was not a significant relationship between gains in achievement and the nominal variables of sex and ethnicity. 7) There were significant relationships between IQ and achievement, and placement in self-contained and resource programs. Students in self-contained placements had lower IQ and achievement levels. 8) Black and Hispanic students were overrepresented in the sample whereas Asians were underrepresented. 9. Males were overrepresented in the sample whereas females were underrepresented.