FACTORS RELATED TO SPECIAL EDUCATION SERVICES IN VIRGINIA SCHOOL DIVISIONS

by

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(ABSTRACT)

The purpose of this study was to verify factors which are related to the provision of special education services in Virginia school divisions and to compare obtained results with similar research completed in the era of permissive legislation by Chalfant in 1965 in Illinois. A diagnostic technique was developed to indicate the proportions of children identified as handicapped expected to be found in a school division.

Indicator variables selected for inclusion in the study were average daily membership, population per square mile, median school years completed, percentage of total civilian labor force unemployed, true value of property, percent black, median household income, percentage of families in urban residence, and the Composite Index. Criteria measures included the proportion of students identified as mentally retarded, learning disabled, speech impaired, emotionally disturbed, and total proportion of all handicapped students.

Indicator variables found significant to the proportion of learning disabled students were median school years completed, percent of the total civilian labor force unemployed, percent black, percent urban, population per square mile, and median household income. Median school years completed, median household income, percent black, and population per square mile were found to be significant in predicting to the proportion of students identified as mentally retarded. Indicator variables related to the proportion of students identified as emotionally disturbed included average daily membership, percent urban, median income, and percent of total civilian labor force unemployed. A low correlation was found between proportion of speech impaired students and percentage of families in urban residence, true value of property, and average daily membership. The total proportion of students identified as handicapped was best predicted by the percent of total civilian labor force unemployed, percent urban and population per square mile.

A special education Expectancy Index was developed to provide a comparative measure for each school division on each criteria measure. The atypical school divisions were diagnosed as having overidentified or underidentified proportions of each criteria measure.

The study confirmed the methodology utilized by Chalfant and yielded an operational model for predicting certain special education services.

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PRESENTATION OF THE PROBLEM

Introduction

A problem long associated with public school special education programs has been the unavailability of services to pupils. The earliest classes were founded in the late 1800's in a few large-city schools. These programs served a small number of pupils. Establishment of district-wide programs in the early 1900's served a greater number of pupils but still left most areas without services. In the mid 1950's a nationwide movement consolidated small school divisions of highly localized resources into divisions with broader-based support. Facilities for identification, diagnosis, and teacher training were strengthened, making possible the formation of classes in areas where services were previously not available. Rapid growth in special education followed, but for many pupils adequate services still were unavailable in individual school divisions (Marshman, 1972).

Studies conducted by the United States Office of Education reported that in 1948 only 12 percent of the nation's handicapped children were receiving special education. In 1963 statistics revealed that 21 percent were being served; by 1967, this figure had grown to 33 percent.

Data gathered for Title VI of the Elementary and Secondary Education Act in 1968 further illustrated significant variation among states in the percentage of handicapped children served. Nineteen states were providing a publicly supported education to fewer than 31 percent of their handicapped children, while eleven states were serving 20 percent or less. Only seven states in 1968-1969 were serving in excess of 51 percent of their handicapped children (Weintraub, Abeson, & Braddock, 1971).

Early Programs

In 1823 Kentucky established the first state school for the deaf. Similar state schools for the deaf and the blind were subsequently established in many other states. The first time public funds were utilized in a private facility for the education of the handicapped was 1852 when Pennsylvania appropriated funds to a private school for education of mentally retarded children (Weintraub, 1971). In 1864 President Abraham Lincoln brought the federal government into special education when he signed into law a bill creating Gallaudet College, an institution of higher education for the deaf (Weinbtraub & Ballard, 1982).

Early public school programs were the result of efforts by individual principals and/or local superintendents without coordination of services on a district or regional basis. Many of the handicapped individuals had been unable to attend

school because of disabilities, inadequate facilities, lack of programs and/or lack of success in school. To the pupils and their parents, special education classes provided an improvement over conditions which had existed previously (Valentine, 1980).

Case Law

The legality of denying a public education to children by exclusion, postponement, or any other means has been challenged through the courts. The basis for this challenge came from the equal protection clause of the Fourteenth Amendment to the United States Constitution, which guaranteed to all people equal protection of the laws. In 1954 the United States Supreme Court ruled in Brown v. Board of Education that racial segregation in the public schools violated the Fourteenth Amendment. The legal significance of equal educational opportunity was expressed:

> "Today, education is perhaps the most important function of state and local governments. Compulsory school attendance laws and the great expenditures for education both demonstrate our recognition of the importance of education to our democratic society. It is required in the performance of our most basic public responsibilities, even service in the armed forces. It is the very foundation of good citizenship. Today it is a principle instrument in awakening the child to cultural values, in preparing him for later professional training, and in helping him to adjust normally to his environment. In these days, it is doubtful that any child may reasonably be expected to succeed in life if he is denied the opportunity of an education. Such an opportunity, where the state has undertaken to provide it, is a

> right which must be made available to all on equal terms." (Brown v. Board of Education, 1954)

It was sixteen years before the concept of equal educational opportunity established in Brown was judicially applied to handicapped children. Two landmark cases established precedents of providing educational opportunities to children with handicaps. Both suits sought action against state statutes and policies that excluded handicapped children from receiving a public education. Pennsylvania Association for Retarded Children (PARC) v. Commonwealth was a class action suit against the Commonwealth of Pennsylvania for its alleged failure to provide all of its school-age mentally retarded children with a publicly supported education (PARC v. Commonwealth of Pennsylvania, 1972).

The PARC suit was resolved by a consent agreement that specified that the state must permit mentally retarded children access to a publicly supported education. The state was required to locate and identify all school-age retarded children who were excluded from the public schools and place them in a "free public program of education and training appropriate to their capability." The decree went on to say that it was highly desirable to educate mentally retarded children in programs most like those for nonhandicapped children (Zettel & Ballard, 1982).

In Mills v. Board of Education (1972), the parents and guardians of seven District of Columbia children brought a class action suit against the District on behalf of all out-of-school handicapped children. Mills, unlike PARC, was resolved by a judgment against the defendant school board. The result was a court order that the District of Columbia had to provide all handicapped children, regardless of the severity of their handicaps, with a publicly supported education. In addition, the court indicated that before any eligible handicapped child could be excluded from a regular school program, alternative educational services designed to meet the child's needs (including special education or tuition grants) had to be provided (Zettel & Ballard, 1982). Judge Waddy also declared that a constitutionally adequate prior hearing and periodic review of the child's status, progress, and the adequacy of any educational alternative must be completed before attempting to exclude an eligible child.

The court addressed the issue of funding of education in the Mills case when it decreed:

> "If sufficient funds are not available to finance all of the services and programs that are needed and desirable in the system, then the available funds must be expended equitably in such a manner that no child is entirely excluded from a publicly supported education consistent with his needs and abilities to benefit therefrom" (Mills v. Board of Education, 1972).

According to Zettel and Ballard (1982), following the PARC and Mills cases, there were 46 similar court cases in 28 different states:

> "From the perspective of the courts, the right of a handicapped child to a free public education was no longer to be questioned. By 1975, in fact, the principle had been irrefutably established in case law by an overwhelming majority of the states." (p. 14)

State Legislation

According to Zettel and Ballard (1982), in 1979 all 50 states had statutory provisions authorizing and requiring them to maintain systems of free public education. The constitutions of about half of those states specified that this education shall be equally available to all children. The constitutions of the majority of the remaining states called for their public education programs to be "general, uniform, and thorough," or "thorough and efficient" (Burgdorf, 1975).

Despite the fact that 49 states have compulsory attendance laws, in 1970 there were nearly two million children aged seven to seventeen who were still not enrolled in school according to the Children's Defense Fund (1974). Children's Defense Fund speculated that this number most likely represented only "the surface" of the total number of school-age children who were not receiving an education.

Some states, prior to 1973, had compulsory attendance laws that actually provided for the nonattendance of certain handicapped children. Some school divisions excluded children because there were no educational programs to meet their needs. Other states limited access to special education programs to children who met strict definitions and/or who met specific behavioral or physical entrance requirements.

State legislation increased in the early 1970's in part due to specific case law dealing with the principle of the right to education. In 1972, Abeson reported that almost 70 percent of the states had adopted mandatory legislation requiring the education of all eligible handicapped children. By 1975, all but two states had adopted mandatory legislation for the majority of handicapped children (Zettel & Weintraub, 1978).

In spite of the above, hearings before the United States Senate Subcommittee on the Handicapped and the United States House Subcommittee on Select Education in 1975 demonstrated that over 1.75 million handicapped children were still being excluded from receiving a public education solely on the basis of their handicaps. Over half of the estimated handicapped population were not receiving the appropriate educational services they needed or to which they were entitled. Many handicapped were still being inappropriately placed in educational settings because their handicaps

remained undetected or because of a violation of their individual rights (United States Congress, Senate, 1975).

Federal Legislation

The United States Office of Education (USOE) established in 1931 the Section on Exceptional Children and Youth. This laid the foundations for future federal involvement in the education of the handicapped. In 1965 federal aid to education was reinforced when the Elementary and Secondary Education Act (ESEA) became law. Under Title I of this act, funds were made available to the states to address the problems of educationally disadvantaged children. Interpretation of legislative intent resulted in handicapped children being considered educationally disadvantaged and thus eligible for funds under the Act.

Public Law 89-313 also became law in 1965. This law amended Title I of ESEA to establish grants to state agencies responsible for providing free public education for handicapped children. The legislation was designed to assist children in state operated or supported schools serving handicapped children who were not eligible for funds under the original act.

In the Elementary and Secondary Education Amendments of 1966, Congress added a new Title VI which began a program of grants to the states to assist in the education of handicapped children, established a National Advisory

Committee on Handicapped Children, and created within the Office of Education, a Bureau of Education for the Handicapped. In 1967, ESEA was amended again to include more programs for the handicapped. Regional resource centers were established to provide testing in determining special educational needs of handicapped children. Funds were allocated to accelerate the recruitment of personnel and to improve the dissemination of information about special education. The 1967 amendments earmarked funds from Title III (Supplementary Educational Centers and Services) to guarantee funds specifically for the handicapped. Additionally, funds were earmarked from Title V to help state educational agencies expand programs for handicapped children. In 1968, Congress mandated that at least 10 percent of each state's allotment of funds from the Vocational Education Act be expended for vocational education programs for handicapped individuals.

The Elementary and Secondary Education Act was again amended in 1969 for the Gifted and Talented Education Assistance Act. State departments of education were authorized to provide technical assistance on programs for the gifted and talented and to provide fellowships for teachers of these children. A provision was also included in this act to fund educational and research services for children with specific learning disabilities.

Public Law 91-230, the Elementary and Secondary Education Amendments of 1970, repealed Title VI and created a separate act as of July 1, 1971, entitled the Education of the Handicapped Act. The Act was divided into seven parts.

In 1974, Public Law 93-380, the Education Amendments of 1974, was adopted which extended the Education of the Handicapped Act for three years. Congress approved an increase in authorization levels for the basic state grant program (ESEA, Title VI-B) which enlarged the potential appropriations to $100 million. These amendments provided (1) a requirement of comprehensive planning by each state in establishing a goal of full educational opportunities for all handicapped children and a timetable toward achievement of that goal, (2) vital guarantees of the educational rights of handicapped children and their parents in due process, (3) a priority in the use of Education of the Handicapped Act funds for children not then receiving an education, (4) a plan from the states that would show how all handicapped children were provided an education in the least restrictive environment, and (5) a mandated plan which would prohibit the classification of children in a racially or culturally discriminatory manner (Public Law 93-380, 1974). All of this, however, fell short of one essential ingredient, namely, an outright mandate from the federal government to the states (Zettel & Ballard, 1982).

The Education for All Handicapped Children Act of 1975 (Public Law 94-142) was passed during the 94th session of the United States Congress. This law made it mandatory for the states to provide public education for all handicapped children. The intent of the Congress was reflected in its statement of purpose:

> "that all handicapped children have available to them . . . a free appropriate education which emphasizes special education and related services designed to meet their unique needs, to assure that the rights of handicapped children and their parents or guardians are protected, to assist states and localities to provide for the education of all handicapped children, and to assess and assure the effectiveness of efforts to educate handicapped children." (Sec. 3, c)

While many of the legislative mandates of Public Law 94-142 were already established in case law, state public policy, and federal legislation before the law was passed, with the passage of Public Law 94-142, handicapped children were given the right to a free appropriate public education. Public Law 94-142 was specific as to what was to occur and appropriated funds to assist state, intermediate, and local education agencies in complying with the mandated responsibilities of providing for the education of all handicapped children.

Implications

During the period of permissive legislation for special education services existing prior to 1975, Chalfant (1967)

identified the demographic characteristics of Illinois school divisions providing special education services. A strong relationship was found among economic and demographic characteristics of counties and the establishment of special education programs in Chalfant's statewide study. Six underlying factors were found to be related to whether or not a division had certain special education programs. The factors were obtained from a total of 31 variables thought to be related to educational programs. The six factors were then used to develop an Expectancy Index which was used to predict the likelihood of a county providing programs for deaf, elementary educable mentally retarded, secondary educable mentally retarded, speech correction, and having a director of special education. The factors provided a statement of the characteristics of political areas (counties) which contributed to the provision of services for children with handicaps.

Each of these factors was composed of several characteristics which existed in some degree in every political area, i.e., county. The six factors obtained were designated (1) urban, (2) education, (3) socioeconomic status, (4) rural occupations, (5) financial ability, and (6) population growth.

The Chalfant (1967) study established that characteristics of political areas influenced the course of special education in those areas. The variables and the

factors derived from them were demonstrated to have sufficient power to be useful in further study of demographic characteristics and their relationship to special education programs.

Public Law 94-142 specifies that recipients of federal funds for the education of the handicapped may exclude no handicapped child from receiving an education, and that all such agencies follow a policy of zero reject (Turnbull & Turnbull, 1978). In other words, the law designates that all handicapped children, regardless of the degree of their disability, are entitled to a free appropriate public education, including any special education and related services necessary to meet their unique educational needs.

In spite of the requirement of zero reject, there is considerable variation among the states as to the percentage of the school population each identifies as being handicapped. For example, Massachusetts, Delaware, Alaska, Vermont, and Maryland identify over 11 percent of their school enrollments as handicapped; others, such as the District of Columbia and the Bureau of Indian Affairs (BIA), indicated that they served less than 6 percent according to December 1982 child count data.

A discrepancy exists between the states and territories with regard to the percentage of individuals served within each of the subclassifications of handicapping conditions. For example, in Alabama and in the Virgin Islands, children

identified as having mental retardation as their principal disability comprise over 45 percent of the total handicapped population. In Utah, on the other hand, the percentage of handicapped children identified as mentally retarded is only 8.8 percent. Similarly, Hawaii reported that during 1980-81 nearly 63 percent of the handicapped children served were learning disabled, while the Virgin Islands and New Mexico identified less than 20 percent of their handicapped students as learning disabled during this period. Table 1 depicts the national incidence rates for 1983-84 for certain disability categories.

As discrepancies exist among states as to the percentage of the school population identified as handicapped, there exists within states a considerable variation in the numbers of pupils identified. Table 2 provides incidence rates (percent of total school enrollment) for certain disability categories for 131 school divisions in the Commonwealth of Virginia in 1984-85. The gross differences observed in reports of enrollments appear in no explanatory pattern which would guide the policies and procedures of administrators.

The results of the present study should be viewed in terms of certain inherent limitations. Statistical descriptions of school divisions were made utilizing December 1984 child count data, projected United States Census data for 1984, and Virginia State Department of Education data for the 1983-84 school year. Errors, variations, and

Table 1: National Incidence Rates
(Percent of Total School Enrollment)
For Certain Disability Categories for
the School Year 1983-84

Learning Disabled	4.57%
Mentally Retarded	1.84%
Emotionally Disturbed	0.91%
Speech Impaired	2.86%

Table 2: Federal Child Count (Ages 3-21) Incidence Rates (Percentage) For Certain Disabilities Within the School Population (1984-85 Fall Membership) for 131 Virginia School Divisions

SCHOOL DIVISION	LEARNING DISABLED	MENTALLY RETARDED	EMOTIONALLY DISTURBED	SPEECH IMPAIRED
ACCOMACK	2.19	1.99	0.20	1.36
ALBERMARLE	5.63	1.76	1.52	5.59
AMELIA	5.47	4.74	1.27	4.01
AMHERST	5.48	1.04	0.26	3.48
APPOMATTOX	2.09	2.38	0.84	2.88
ARLINGTON	7.15	0.67	1.18	1.20
AUGUSTA	5.02	0.96	0.53	3.58
BATH	5.54	1.51	0.30	4.33
BEDFORD	4.12	1.82	0.50	2.42
BLAND	8.76	1.28	0.09	3.32
BOTETOURT	6.34	1.00	0.64	2.10
BRUNSWICK	4.64	1.93	0.68	2.18
BUCHANAN	2.79	2.47	0.04	2.56
BUCKINGHAM	2.12	2.93	0.00	5.19
CAMPBELL	6.89	1.24	0.36	3.31
CAROLINE	3.78	2.68	0.60	3.56
CARROLL	6.43	1.53	1.08	5.94
CHARLES CITY	3.59	2.34	0.75	5.34
CHARLOTTE	1.16	2.69	0.12	2.90
CHESTERFIELD	4.74	0.88	0.95	3.84
CLARKE	5.68	1.12	0.62	2.25
CRAIG	7.08	0.56	0.00	5.83
CULPEPER	5.44	1.29	0.27	3.59
CUMBERLAND	3.95	3.13	0.54	2.45
DICKENSON	3.34	1.36	0.21	2.34
DINWIDDIE	4.58	2.23	0.69	2.20
ESSEX	4.25	2.79	0.47	5.65
FAIRFAX	6.97	0.51	0.52	2.81
FAUQUIER	5.40	1.19	0.65	2.82
FLOYD	7.39	1.47	0.46	2.13
FLUVANNA	6.00	1.98	0.05	3.77
FRANKLIN	4.28	2.53	1.22	3.48
FREDERICK	4.43	2.14	0.70	3.33
GILES	3.80	3.47	1.13	1.73
GLOUCESTER	3.56	0.99	1.39	2.69
GOOCHLAND	6.82	4.49	0.67	3.55
GRAYSON	3.47	2.17	0.12	4.93
GREENE	6.43	1.47	1.71	6.43
GREENSVILLE	2.33	2.18	0.81	3.61

Table 2 (Cont'd.)

SCHOOL DIVISION	LEARNING DISABLED	MENTALLY RETARDED	EMOTIONALLY DISTURBED	SPEECH IMPAIRED
HALIFAX	3.65	1.40	0.41	2.51
HANOVER	4.44	0.86	1.39	2.95
HENRICO	3.56	1.84	1.13	2.20
HENRY	2.15	2.03	0.22	5.77
HIGHLAND	8.57	2.86	0.66	5.27
ISLE OF WIGHT	3.39	1.64	0.57	1.64
KING GEORGE	4.85	2.62	0.31	2.88
KING QUEEN	4.56	2.63	1.11	5.47
KING WILLIAM	5.68	2.08	1.15	2.23
LANCASTER	1.67	1.24	0.07	3.77
LEE	3.85	2.82	0.04	3.43
LOUDOUN	4.60	1.14	0.48	4.52
LOUISA	4.43	2.39	0.41	2.71
LUNENBURG	1.89	2.29	0.18	1.49
MADISON	3.29	2.56	0.28	4.29
MATHEWS	5.89	1.33	1.00	3.65
MECKLENBURG	1.99	2.05	0.87	2.03
MIDDLESEX	5.74	1.44	0.93	4.39
MONTGOMERY	5.73	1.75	0.43	3.57
NELSON	1.66	1.89	0.05	3.14
NEW KENT	6.07	1.13	2.38	4.48
NORTHAMPTON	2.46	2.41	0.00	3.29
NORTHUMBERLAND	3.64	1.68	0.56	6.02
NOTTOWAY	5.53	3.38	0.19	4.42
ORANGE	2.82	2.37	1.03	3.79
PAGE	3.44	1.61	0.29	4.14
PATRICK	4.62	2.66	0.13	2.56
PITTSYLVANIA	3.09	2.09	0.23	3.00
POWHATAN	5.93	1.63	0.86	1.81
PRINCE EDWARD	2.59	3.01	0.04	4.64
PRINCE GEORGE	3.44	1.89	0.48	3.93
PRINCE WILLIAM	4.48	0.74	0.60	2.52
PULASKI	3.08	2.06	1.36	1.63
RAPPAHANNOCK	4.60	1.98	1.00	4.40
RICHMOND	3.13	1.68	0.16	4.49
ROANOKE	3.57	0.94	2.06	2.03
ROCKBRIDGE	4.41	2.88	0.29	3.69
ROCKINGHAM	4.73	1.40	0.26	3.58
RUSSELL	2.40	2.56	0.24	4.18
SCOTT	3.66	2.65	0.08	3.95
SHENANDOAH	4.53	1.50	0.42	4.95
SMYTH	2.61	2.02	0.06	2.17
SOUTHAMPTON	4.94	4.10	1.35	2.83

Table 2 (Cont'd.)

SCHOOL DIVISION	LEARNING DISABLED	MENTALLY RETARDED	EMOTIONALLY DISTURBED	SPEECH IMPAIRED
SPOTSYLVANIA	2.33	1.21	0.24	4.84
STAFFORD	3.64	1.29	1.24	3.33
SURRY	2.82	1.77	1.24	3.35
SUSSEX	1.11	4.44	0.11	3.86
TAZEWELL	1.41	2.23	0.03	3.37
WARREN	4.41	2.15	0.52	6.27
WASHINGTON	3.92	0.68	0.27	2.11
WESTMORELAND	3.17	2.53	0.20	4.05
WISE	2.54	1.95	0.58	2.05
WYTHE	5.23	1.67	0.93	4.07
YORK	3.92	0.82	0.25	2.54
ALLEGHANY HIGHLAND	4.89	1.38	0.28	4.21
ALEXANDRIA	6.78	1.06	1.58	0.78
BRISTOL	4.73	1.59	0.56	3.31
BUENA VISTA	1.78	3.56	0.44	3.11
CHARLOTTTESVILLE	6.35	2.17	1.57	4.95
COLONIAL HEIGHTS	5.73	1.07	1.00	3.87
COVINGTON	5.59	1.44	0.00	5.97
DANVILLE	3.27	1.36	0.33	2.12
FALLS CHURCH	8.58	0.66	0.75	5.00
FREDERICKSBURG	5.08	2.29	0.35	2.03
GALAX	2.26	2.49	0.00	4.20
HAMPTON	3.97	1.67	1.35	1.70
HARRISONBURG	5.19	0.99	0.74	2.61
HOPEWELL	4.50	2.64	2.83	4.45
LYNCHBURG	5.29	1.33	0.93	2.88
MARTINSVILLE	4.24	2.75	0.22	2.35
NEWPORT NEWS	4.62	1.50	0.57	2.80
NORFOLK	4.98	1.91	0.96	3.09
NORTON	3.82	2.84	2.16	1.76
PETERSBURG	2.12	2.87	1.97	2.28
PORTSMOUTH	2.05	1.65	0.38	3.96
RADFORD	3.81	1.61	1.55	2.20
RICHMOND CITY	3.06	2.68	1.36	3.53
ROANOKE CITY	5.14	2.64	0.59	1.78
STAUNTON	3.86	1.15	0.23	0.07
SUFFOLK	2.70	2.22	0.79	3.38
VIRGINIA BEACH	3.05	0.77	0.64	3.34
WAYNESBORO	1.90	1.23	0.28	2.37
WILLIAMSBURG	4.76	1.51	0.93	1.92
WINCHESTER	4.76	2.08	0.88	4.07
SOUTH BOSTON	4.86	1.27	1.16	3.70
FRANKLIN CITY	4.69	1.55	0.62	1.60

Table 2 (Cont'd.)

SCHOOL DIVISION	LEARNING DISABLED	MENTALLY RETARDED	EMOTIONALLY DISTURBED	SPEECH IMPAIRED
CHESAPEAKE	3.72	1.11	0.44	3.06
LEXINGTON	3.01	0.60	0.20	4.21
SALEM	4.58	1.60	1.06	2.17
POQUOSON	5.23	0.18	2.10	2.06
MANASSAS CITY	6.08	0.83	0.73	2.50
MANASSAS PARK	7.70	1.53	0.60	4.32

inaccuracies from any of these sources would subsequently affect the statistics derived.

Statement of the Problem

In his research, Chalfant (1967) attempted to identify objective evidence concerning the factors which were related to the provision of special education services in the public schools. Concern was focused on the fact that there was wide variability in providing any type of special education services in Illinois in the early 1960s. Some counties provided specialized programming and some did not under permissive laws.

In order to compare the characteristics of counties that provided or did not provide specific special education services, it was necessary to select those variables presumed to be related to special education provisions. A survey was conducted by Chalfant of the demographic and economic data which are systematically compiled by county, state, and federal agencies. Those variables which seemingly described the demographic and economic characteristics of Illinois counties were selected for study. Thirty-one "indicator variables" were chosen. Chalfant's original variables are listed in Appendix A.

Chalfant's research was completed prior to many state mandates and unequivocal federal mandates to provide special education programming. Public Law 94-142 now ensures that

each state receiving funds provides for the unique educational needs of each student. The assurance of "zero reject" makes moot the question of what demographic and/or economic factors are associated with a county that does or does not provide special education. Theoretically, all identified students receive appropriate programming. However, since the identified variables were mostly successful in predicting program provision, they may be useful in predicting the proportion of children of the total school enrollment that are served in special education programs in Virginia school divisions.

The problem to be addressed by this study, therefore, is the lack of research confirming demographic and economic variables associated with local incidence for certain disabilities within the school population. If such variables could be identified, then school divisions could be objectively compared and a differential diagnosis of the assets, or deficits, of specific school divisions could be provided.

Since this study is a replication of research originally done prior to the passage of Public Law 94-142, the current data can be readily compared to earlier data. Of particular interest in this study is the twenty year span and passage of mandatory legislation. A close analysis of the past should allow for more accurate planning for the future.

Purpose of the Study

The purpose of this study was to (1) determine the nature of economic and demographic factors which were related to the provision of special education services in Virginia school divisions, (2) compare the results obtained with earlier results obtained by Chalfant, and (3) extend the empirical knowledge base related to this topic.

Research Question

In view of the need to revalidate the study conducted by Chalfant in 1965, this study was designed to answer the following research question:

> Can a Virginia school division's economic and demographic characteristics predict the proportion of the total school enrollment served in selected special education programs?

This question was answered by verifying the applicability of Chalfant's original factors, gathering data relevant to the selected factors, and then applying a multiple regression equation to predict the proportion of children served in selected special education programs in Virginia school divisions. In doing so, the threefold purpose of this study was met.

Operational Definitions

The following definitions were utilized in this study:

1. Handicapped children means those children evaluated, in accordance with Virginia regulations, as being mentally retarded, hard of hearing, deaf, speech and language impaired, autistic, visually handicapped, seriously emotionally disturbed, orthopedically impaired, other health impaired, deaf-blind, severely and profoundly handicapped, multihandicapped, or as having specific learning disabilities, who, because of these impairments, need special education and related services.
2. Mentally Retarded (MR): means significantly subaverage general intellectual functioning existing concurrently with deficits in adaptive behavior and manifested during the developmental period, which adversely affects a child's educational performance.
3. Seriously Emotionally Disturbed (ED): is defined as follows:
    1. The term means a condition exhibiting one or more of the following characteristics over a long period of time and to a marked degree which adversely affects educational performance:

a. an inability to learn which cannot be explained by intellectual, sensory, or health factors;

b. an inability to build or maintain satisfactory interpersonal relationships with peers and teachers;

c. inappropriate types of behavior or feelings under normal circumstances;

d. a general pervasive mood of unhappiness or depression; or

e. a tendency to develop physical symptoms or fears associated with personal or school problems.

2. The term includes children who are schizophrenic. The term does not include children who are socially maladjusted, unless it is determined that they are seriously emotionally disturbed.

4. Specific Learning Disability (LD): means a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculations which adversely affects the child's educational

performance. The term includes such conditions as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. The term does not include children who have learning problems which are primarily the result of visual, hearing, or motor handicaps, of mental retardation, of emotional disturbances, or of environmental, cultural, or economic disadvantage.

5. Speech and Language Impaired (SI): means a communication disorder, such as stuttering, impaired articulation, a language impairment, or a voice impairment, which adversely affects a child's educational performance (Section 300.5, C.F.R.).

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

The purpose of this study was to verify factors which are related to the proportion of children identified as handicapped in a school division and to compare obtained results with similar research completed in the era of permissive legislation by Chalfant (1967). In attempting to extend the research in this area, awareness and knowledge of the variables which may mediate or exacerbate the number of children with handicaps identified in a school division is essential. The following chapter has, therefore, been structured to provide a presentation and critical review of empirical studies using demographic and economic characteristics as predictors.

The Effect of Wealth and Program Quality

Studies of the relationships between wealth and program quality were summarized by Morphet, Johns and Reller (1959) and Greider, Pierce and Jordan (1969). School division wealth was believed to be a factor in achieving a basic level of program quality. Increased expenditure, given favorable conditions, resulted in improved programs. Although the literature did not indicate specific reference to special

education programs, wealth was accepted as a basic component affecting education programs.

An elementary effort at providing data on the relationship between cost and quality of special education programs is found in a study which examined a number of cost and program quality indicators in a sample of nine of the largest Board of Cooperative Education Services (BOCES) special education programs in New York. The cost factors included (1) actual per pupil expenditures, (2) a cost index derived by comparing special education expenditures to regular per pupil expenditures in the same systems, (3) a tax effort index, and (4) an adjusted special education cost index, taking into consideration the tax effort in the component districts of each BOCES (Burello & Sage, 1979).

Conclusions drawn from the relationship between cost and quality factors suggest that school divisions having higher cost indices tend to also have a higher proportion of children placed outside the local public program, a lower rating on the presence of normalizing experiences for pupils, and a lower proportion of students attending integrated as opposed to segregated programs in the division (Burello & Sage, 1979). These observations lend support to the idea that services provided in least restrictive environments tend to be less expensive. Burello and Sage (1979) point out that the problem in interpreting this observation and using it as a basis for firm conclusions lies in the uncertainty of

whether these expensive, segregative services can possibly be handled in any other way. One must assume that the severity of handicaps in the population have been randomly distributed and that a choice of whether to utilize a more or less restrictive programming alternative has been an open one.

The Effect of Distribution of the Population

School division size was studied extensively in the early 1950's relative to efforts in district reorganization. In the late 1950's attention was focused upon school size as the education field attempted to strengthen academic instruction (Conant, 1959). Faber (1966) and Morphet, Johns and Reller (1959) indicated specific limits as necessary for delivery of adequate educational services. A minimum of 1,500-2,000 pupils was necessary to support a comprehensive instructional program. A full program of specialized services required an administrative unit of 10,000-15,000 pupils. Ten thousand pupils were found to be the minimum for offering a full range of services with 10,000 to 20,000 as the ideal size for special services and comprehensive programming (Faber, 1966).

Kidd (1970) suggested that a general population base of at least one-half million, 150,000 typically of school age, is necessary for an efficient and effective special education

service organization and administration if such services are to be rendered by a single unit of administration.

According to Foster and Carpenter (1978) the average school division in the United States has a low enrollment. More than half (53.6%) of the operating school systems in 1977 had fewer than 1,000 pupils each. Knezevich (1975) found that studies over the last 30 years have recommended a basic enrollment of from 1,000 to 10,000 pupils, grades K through 12 inclusive, to provide a comprehensive program for regular pupils at reasonable cost.

If a hypothetical school division enrolled 1,000 pupils, the number of handicapped children probably would be somewhere around 108, as shown in Table 3. Howe (1981) pointed out that a school division of this size likely cannot program adequately for low-prevalence handicapped children and may or may not be able to do so for those classified in the mild and moderate ranges.

Kohl and Marro (1971) concluded that 8,000 to 10,000 regular pupils are necessary before a comprehensive specialized program can be developed and financial resources used efficiently. Gallagher (1972) noted that not every community can provide entirely for the specialized needs of blind, deaf, cerebral palsied or multiply handicapped children.

Among the factors affecting the cost of education, one of the most fundamental ones is the configuration of the

Table 3: Approximate Numbers of Certain Handicapped Children in an Average School System of 1,000 Pupils

Handicapping Condition	Percentage of Total School Enrollment	Number of Pupils
Mentally Retarded	1.84	18
Learning Disabled	4.57	46
Emotionally Disturbed	1.0	10
Speech Impaired	2.9	29
Other	.5	5
Total		108

Adapted from figures released by the U.S. Department of Education for school year 1983-84.

population in its distribution on the earth's surface. As has been shown, this distribution profoundly affects the provision of programs for identified handicapped youngsters. Meyen (1978) pointed out the difference in prevalence and incidence relative to handicapped youngsters. He defined prevalence as the number of exceptional children currently existing while incidence refers to the number of children who, at some time in their life, might be considered exceptional. The latter figure would be much higher and more difficult to substantiate.

Population density was discussed by Morphet, Johns and Reller (1959) as related to size and cost of operation. They found that when density was high, agreement on objectives and cooperation in program planning were difficult. An extremely low density prohibited provision of adequate programs at economical cost (Morphet, Johns, & Reller, 1959).

Kennedy and Danielson (1978) studied the variations in the density of populations of certain handicapping conditions so that estimates of the location of unserved children could be made. Use of demographic data was made to provide indicators of where probable unserved children might be.

The Effect of Characteristics of the Population

Some characteristics of pupils have been shown to have an effect on special education placement decisions. If pupils in need of special education show certain demographic

characteristics, then assessing a population for these characteristics may provide a rough estimate of the number of special needs children.

Rubin, Krus, and Balow (1973) studied the possible basis for differential school placement of children with similar levels of intelligence. They selected children who had been identified as having low IQ by an independent agent and followed them through the years to compare those who were assigned to special classes to those remaining in regular classroom programs. Socio-economic status (SES), intelligence, school readiness and language, school placement and behavior, and school achievement were analyzed. SES was the one factor that significantly differentiated between low IQ regular class pupils and low IQ special class pupils of both average and low IQ, with the special class subjects obtaining lower SES index scores.

MacMillan, Jones, and Aloia (1974) indicated that minority children are overrepresented among those labeled with minimal retardation and most children with minimal retardation come from low socioeconomic homes. A measure of socioeconomic status was selected for inclusion in this study because studies have found an over representation of children from lower SES families in classes for the handicapped (Mercer, 1973; Rubin, et al., 1973; Matuzek & Oakland, 1979). Racial composition of the school district was included because of the data which indicate a tendency for school

divisions with a lower percentage of black enrollment to have a greater percentage of over representation of black children in special education classes (Keyes, 1982).

In the era of permissive legislation prior to passage of Public Law 94-142, there were studies linking prevalence of handicaps with socioeconomic status. Voelker and Mullen (1970) stated that data that permit a "precise statement of the prevalence of mental retardation are not presently available." They estimated that approximately 3 percent of the school population falls within this classification. In 1962 Goldstein estimated that 6-7 percent of the school population in a below-average socioeconomic community would have IQ's below 75 on a Stanford-Binet Scale as compared with 3-4 percent in an average to superior socioeconomic community.

Patrick and Reschly (1982) identified correlates of mental retardation prevalence. Demographic variables significantly correlated with school division prevalence include illiteracy, percentage of black students, educational level, per capita income, and educational cost per pupil. The authors noted that the demographic variables studied have a large degree of commonality with conventional measures of SES. Patrick and Reschly concluded that the demographic variables, identified in this study as significantly related to prevalence, might be viewed as indirect reflections of societal expectations and standards.

Sufrin (1962) noted that improvement in school excellence through increased expenditures per pupil was not wholly related to income but may be explained by other economic and noneconomic factors as well. School expenditures per pupil have a wide range of elasticity with respect to personal income. Sufrin reiterated the significance of community aspirations in supporting schools. This viewpoint may continue to be reflected in a community's commitment to identify handicapped youngsters. What is the profile of a community's economic and noneconomic factors relative to the proportion of identified handicapped students?

The Effect of Characteristics of the Political Subdivision

The political subdivision in this study was the level on which the school division is administered. In Virginia the political subdivision is either a town, city, or county.

Rottman (1965) conducted a descriptive analysis of special education enrollments in all the states. Relative differences in enrollments and their relationships to eight measures of centralization and wealth were studied. Rottman found extreme differences from state to state with enrollments normally distributed but positively skewed. The centralization and wealth factors in combination were related to each type of handicap. However, no single measure was

related to all types (Rottman, 1965). Rottman's study served primarily to indicate the feasibility of economic and demographic investigation of discrepancies in special education enrollments.

A strong relationship was found among economic and demographic characteristics of counties and the establishment of special education programs in Chalfant's (1967) statewide study. This current research was based on Chalfant's original study. Chalfant found six underlying factors to be related to whether or not a school division has certain special education programs. The factors were obtained from a total of 31 variables thought to be related to educational programs (see Appendix A). The six factors were then used to develop an expectancy index which was used to predict the likelihood of a county providing programs for deaf, elementary educable mentally retarded, secondary educable mentally retarded, speech impaired and the presence of a director of special education. The factors provided a statement of the characteristics of political areas which contributed to the provision of services for handicapped children.

In Chalfant's study each factor was composed of several characteristics which existed in some degree in every political area. The six factors obtained were designated (1) urban, (2) education, (3) socioeconomic status, (4) rural occupations, (5) financial ability, and (6) population

growth. The urban factor was composed largely of population, school attendance, income and occupation variables. The education factor was influenced by income and occupation variables as well as education variables. The socioeconomic status factor represented primarily occupation and education variables. The rural occupations factor represented occupation, income and residence variables. The financial ability factor was influenced primarily by school district wealth and size. The remaining factor was population growth and was influenced by occupation, migration, and size variables. A summary of the variables comprising each factor with the factor loadings and accountable variance follow in Table 4.

The Chalfant (1967) study established that characteristics of political areas influence the course of special education in those areas. The variables and the factors derived from them were demonstrated to have sufficient power to be useful in further study of demographic characteristics and their relationship to special education programs.

Marshman (1972) completed a statewide study in which the financial condition of the school division, the occupational predominance of the community, the population density, the size of the school division and the Federal program component were factors that apparently affect school programs. Availability and scope of services at the local level largely

Table 4: Summary of Factor Variables and Accountable Variance From Chalfant's 1967 Research

Factor I -- Urban

Indicator Variables	Factor Loadings
Public School Average Daily Attendance (K-12)	97
Total Population	97
Population per Square Mile	96
Private School Enrollments (1-12)	95
Equalized Assessed Valuation per County	94
School Age Children per Square Mile	92
Family Income $10,000 or more	88
Civilian Migration	83
Change in Public School Average Daily Attendance % (1951-1961)	80
Median Family Income	79
Employed in While Collar Occupations %	72
Average Daily Attendance of Largest District in County	71
Urban Residence %	68
Employed in Manufacturing %	58
Employed in Finance, Insurance, and Real Estate %	56
Median School Years Completed	47
Completed High School or more	-66
Employed in Agriculture %	-69
Rural Farm Residence %	-71

(Accountable Variance 44%)

Factor II--Education

Indicator Variables	Factor Loadings
Completed High School or More	68
Median School Years Completed	66
Change in Public School Average Daily Attendance % (1951-1961)	42
Median Family Income	39
Family Income $10,000 or more	32
Family Income $3,000 or less	-46
Employed in Transportation, Communication, Public Utilities %	-52
Non White Population %	-63
Unemployed %	-81
Completed Less than 5 Years School	-83

(Accountable Variance 13%)

Factor III--Socio Economic Status

Indicator Variables	Factor Loadings
Employed in Education %	66
Employed in White Collar Occupations %	60
Employed in Wholesale and Retail Trade %	60
Completed High School or more	43
Median School Years Completed	38
Employed in Finance, Insurance and Real Estate %	36
Employed in Transportation, Communication, Public Utilities %	36
Urban Residence	31
Rural Farm Residence %	-34
Employed in Manufacturing %	-36

(Accountable Variance 8%)

Factor IV--Rural Occupations

Indicator Variables	Factor Loadings
Employed in Public Administration %	67
Employed in Agriculture %	48
Rural Farm Residence %	45
Family Income $3,000 or less	40
Median Family Income	-34
Urban Residence %	-44
Employed in Manufacturing %	-58

(Accountable Variance 6%)

Factor V--Financial Ability

Indicator Variables	Factor Loadings
Valuation per Child in Average Daily Attendance	78
Average Daily Attendance of Largest District in County	-37
Ratio of Largest School District to Total County Average Daily Attendance	-83

(Accountable Variance 5%)

Factor VI--Population Growth

Indicator Variables	Factor Loadings
Employed in Construction %	83
Employed Outside County %	54
Civilian Migration	34
Average Daily Attendance of Largest District in County	-37

(Accountable Variance 4%)

were reflected in the size of programs and the diversity of services according to Marshman. The purpose of his study was to investigate discrepancies in size and diversity of special education programs among school divisions in the state of Delaware. The division variables used by Marshman included assessed valuation per pupil as a functional measure of wealth in a division, the Relative Ability Index based on the full value of real estate per pupil enrollment, as a measure of ability to provide local funds for schools, total enrollment as the basic measure of the operational size of a school division, population per square mile as a measure of the population density for each division, median family income as a measure of socioeconomic status, full-time leadership in special education as a measure of school division activity on behalf of the program, and amount of Federal Program Components Per Pupil as a measure of activity in development of special education programs.

Marshman (1972) concluded that size (i.e. total enrollment) was the most important component in the context of special education. Median income affected program size. Special education programs were expanded, diminished or diversified on factors other than wealth and the effect of population density was uncertain.

Valentine (1980) conducted a study in Florida to determine the relationship between school division expenditures and selected demographic characteristics. The

demographic characteristics of the school divisions were size of the school division, wealth of the division, percentage of handicapped children in the division, and percentage of minority handicapped children in the division. Valentine found significant correlations between division size and indirect costs, between division wealth and purchased services, and between percentage of minority handicapped and materials/supplies. It was concluded that planned division expenditures were unique to each division and assumed to be related to "the background or history of the division."

Conclusions

The reasons why school divisions, either individually or through joint agreements, did or did not establish special education programs under permissive law are not clear. Chalfant (1967) advanced the explanation that variables such as number of handicapped children needing services, socioeconomic variables, local ability to pay and local attitude were related to the provision of special education services. This dissertation addressed itself to the task of verifying Chalfant's factors in the age of mandatory services.

CHAPTER III

METHODOLOGY

Introduction

This study was designed to conduct additional research on the nature of economic and demographic factors which relate to the provision of special education. This study was a replication of the study by Chalfant (1967) who developed an operational model to help explain why special education services are provided in some Illinois counties but not in others. The design of the present study closely paralleled that operational model in order to compare obtained results. The operational model has the following components:

The Unit of Study

1. A representative sample of special education services to be studied.
2. A comparative statistic.
3. The pertinent variables which describe the demographic and economic characteristics of school divisions.
4. A statistical method of analysis.

Four special education services were selected for study, including those for the learning disabled, the mentally handicapped, the emotionally disturbed, and the speech

impaired. The proportion of the total pupil population receiving each special education service was determined for each of 131 Virginia school divisions and studied in relation to demographic and economic characteristics presumed to be related to these services.

In this study, school divisions in Virginia were selected as the unit of study. In 1965, Chalfant used the county as the unit of study. Since school divisions in Virginia are politically defined as county systems, city or town systems, or a combination of the two, there was comparability to Chalfant's county unit of study. By continuing to use the county as the basic unit, the operational model enjoys as wide a range of potential applications as possible. A variety of geographic, economic, demographic, and educational data are available for each county. These data are compiled systematically at regular intervals by county, state and federal agencies and may be obtained upon request. City school divisions were included in the study since data are gathered systematically for these areas locales. Town school divisions not included in the study were Cape Charles, Colonial Beach, Fries, and West Point. Individual census data are not available for these areas.

The Criteria Measures

The criterion measure selected for each area of exceptionality consisted of the proportion of the total pupil population base receiving the special education services. The general formula for determining the criteria measures is presented below.

$$P = \frac{N}{M}$$

Where P = Proportion of the school division pupil population base receiving the special services

Where N = Number of students receiving the special services

Where M = School division membership

The number of students receiving the special services under study came from Virginia's 1984 annual count of handicapped students. This student "child count" is taken annually on the first day of December each year. Students included in the count range in age from 3 through 21 except as otherwise indicated. This is an unduplicated count. Therefore, where a child may be classified as having two or more disabilities, or is receiving speech services in addition to a certain special education program, that child is reflected only once.

Variables Presumed to be Related to Special Education Programs

In order to compare the characteristics of school divisions, it was necessary to select those variables presumed to be related to special education provisions. Chalfant (1967) chose the variables listed in Appendix A.

An informal survey of special education administrators, chief school financial officers, state department personnel and university education faculty helped narrow the variables from Chalfant's original 31. Chalfant's research concluded that some variables were stronger predictors than others. Those variables which seemingly described the demographic and economic characteristics of Virginia school divisions were selected for study. A description of each variable is presented below.

1. Average Daily Membership (ADM): the average number of pupils belonging each day in a room, school, or school division for the 1983-84 school year. ADM is determined by dividing the sum of the days present and absent of all pupils when school is in session during a given period by the number of days school is in session during this period.
2. Population Per Square Mile: the number of inhabitants divided by the square miles of land area in 1980.

3. Median School Years Completed: the highest grade (or year) of regular school completed by the 1980 population. The median number of school years completed is the value which divides the population group into two equal parts--one half having completed more, and the other half less schooling than the median.
4. Total Civilian Labor Force, Percent Unemployed: unemployed civilians 16 years old and over and not "at work" during the reference week of the 1980 U.S. Census or were looking for work during the last four weeks of the 1980 U.S. Census.
5. True Value of Property: the equalized value of real estate and public service corporations in a political subdivision in 1980.
6. Percent Black: the percentage of the total population who indicated their race as Black or Negro, as well as persons who did not classify themselves in one of the specific race categories on the 1980 Census questionnaire, but reported entries such as Jamaican, Black Puerto Ricans, West Indian, Haitian, or Nigerian.
7. Median Household Income: the amount which divides the population distribution into two equal groups, one having incomes above the median and the other having incomes below the median in 1980.

8. Families in Urban Residence, Percentage: all persons living in places of 2,500 inhabitants or more incorporated as cities, boroughs, villages, and towns, or in unincorporated municipalities with a density of 1,500 persons or more per square mile in 1980.

9. Percent Handicapped: the proportion of school enrollment per school division identified as handicapped.

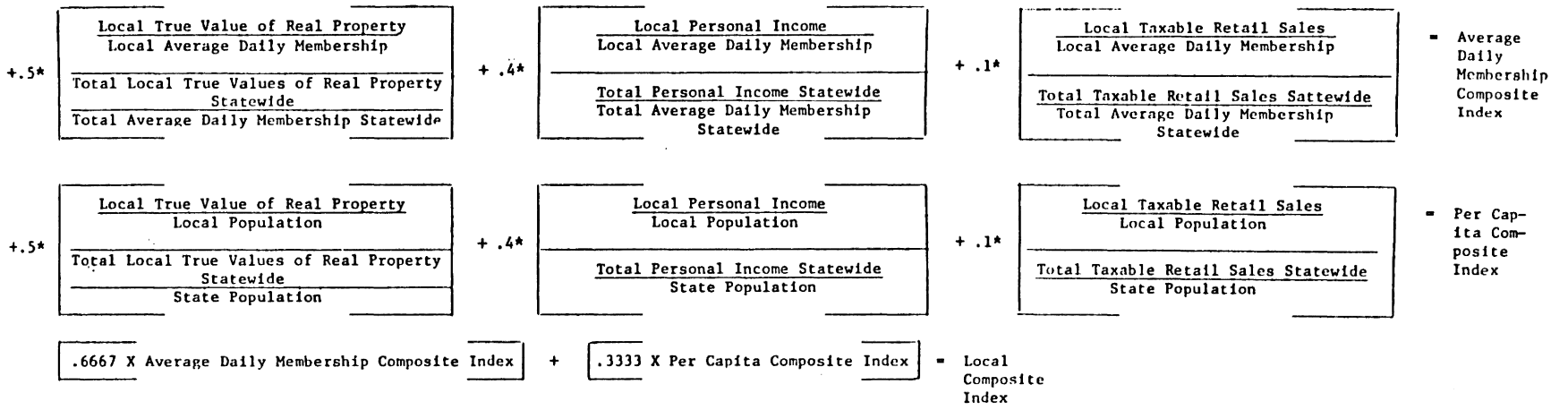
10. Local Composite Index (LCI): a measure of fiscal capacity used to distribute Basic State Aid in Virginia. It contains three separate measures of fiscal capacity: wealth (true valuation of real property), economic indicator (personal income), and economic activity (sales receipts) (VEA, 1982). (See Figure 1.)

Data Sources

The data used in the dissertation were obtained from these sources:

1. United States Bureau of the Census
   Washington, DC

2. The Tayloe Murphy Institute
   The Colgate Darden Graduate School of Business Administration
   The University of Virginia
   Charlottesville, VA



*The constants (.5, .4, and .1) represent the average share of local revenues gathered from real property taxes, charges and miscellaneous revenue, and the 1 per cent local option sales tax, respectively. Personal income data are used in the above formula as a proxy for the taxes derived from local charges and miscellaneous revenue because detailed information on the latter is not available. This is specified in the Appropriations Act of the 1982 General Assembly.

Figure 1. Calculation of Local Composite Index

3. Commonwealth of Virginia
   Department of Education
   Richmond, VA
   Division of Special Education
   Division of Management Information Services

All data regarding school enrollment and/or membership, true value of property, and percent handicapped were obtained from the Virginia Department of Education. Data concerning area size, population, education, and labor force were obtained from the United States Bureau of the Census and/or The Tayloe Murphy Institute.

Basis for Selection

The four special education services selected for study by Chalfant (1967) included those for the deaf, the speech handicapped, the educable mentally handicapped, and those of a director of special education. The current research included services for the mentally retarded, the speech impaired, the learning disabled, and the emotionally disturbed, as well as the total proportion of all handicapped.

In the era of permissive programming for the handicapped, few, if any, learning disabled students were formally identified. However, this group now accounts for nearly fifty percent of all handicapped. Emotionally disturbed were likewise seldom, if ever, identified and provided appropriate educational settings. The emotionally

disturbed now account for nearly one percent of all handicapped.

National and state figures are readily available for the disability categories selected. This availability enhances the application of the methodology outlined in the current study.

Special Education Services Selected for Study

Four special education services were selected for study. The four areas of exceptionality included mentally retarded, learning disabled, seriously emotionally disturbed, and speech impaired. Together, these four areas account for 93 percent of identified handicapped students in Virginia. The total proportion of all students identified as handicapped was also included as a dependent variable.

A mentally retarded student refers to one who has significantly subaverage general intellectual functioning existing concurrently with deficits in adaptive behavior and manifested during the developmental period, which adversely affects a child's educational performance (Section 300.5, C.F.R.).

A learning disabled child refers to one who has a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell or to do

mathematical calculations, which adversely affects the child's educational performance. The term includes such conditions as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. The term does not include children who have learning problems which are primarily the result of visual, hearing, or motor handicaps, or mental retardation, of emotional disturbance, or of environmental, cultural, or economic disadvantage (Section 300.5 C.F.R.).

Speech Impaired means a communication disorder, such as stuttering, impaired articulation, a language impairment, or a voice impairment, which adversely affects a child's educational performance (Section 300.5 C.F.R.).

Seriously Emotionally Disturbed means a condition exhibiting one or more of the following characteristics over a long period of time and to a marked degree, which adversely affects a child's educational performance:

a. An inability to learn which cannot be explained by intellectual, sensory, or health factors;
b. An inability to build or maintain satisfactory interpersonal relationships with peers and teachers;
c. Inappropriate types of behavior or feelings under normal circumstances;
d. A general pervasive mood of unhappiness or depression; or

e. A tendency to develop physical symptoms or fears associated with personal or school problems (Section 300.5 C.F.R.).

Statistical Treatment

To study the relationship between the proportion of students identified as handicapped in Virginia school divisions and the economic and demographic characteristics of counties, analysis procedures were completed with the aid of computer facilities at Virginia Polytechnic Institute and State University. Specific statistical procedures were selected on the basis of their ability to provide analyses appropriate to the hypothesis posed by this study. The SPSS Batch system, a comprehensive tool for managing, analyzing, and displaying data, was used in this study.

To investigate the interrelationships among the variables, an intercorrelation matrix was computed. The raw data matrix consisted of raw scores of 31 demographic-economic variables for each county.

Three general purposes of the analysis were set forth:

1. To examine the distribution among school divisions of resources and characteristics represented by the variables.
2. To examine associative relationships and predictive power among the variables.
3. To elicit hypotheses regarding further study.

Multiple regression analysis was used to determine the relative strength of the economic and demographic variables in predicting the proportion of children per school division receiving special education services in each area studied.

Development of the Special Education Expectancy Index

Chalfant (1967) developed a special education index to provide a comparative measure of the likelihood or expectancy that counties would provide special education services and to compare expectancy to provide services among counties of approximately the same potential ability. Chalfant (1967) generated factor scores which were then used in a prediction equation in standard score form.

This study developed a Special Education Expectancy Index in a similar fashion but utilized the raw score form. The Expectancy Index in this study was developed to provide a comparative measure of the likelihood or expectancy that school divisions would vary from national and state incidence figures for proportion of students identified as receiving selected special education services. The Index was also used to compare proportions of identified handicapped students among school divisions of approximately the same potential ability.

The procedure for developing the Expectancy Index is outlined as follows:

1. Actual scores were obtained for 131 school divisions for each of the nine economic and demographic variables.
2. Through multiple regression analysis of the nine variables and each of the five criteria variables regression coefficients (b) and a regression constant (a) were obtained.
3. A comparative index score was developed for each special education service studied. The expectancy score is the same as the predicted score generated by SPSS procedures. The prediction equation in raw score form generated the expectancy index scores for each school division. For example:

Index score for Bedford County on MR Services $= b_1X_15 \ldots b_9X_9 + a$

where b_k = the regression coefficient for MR services

x_k = the obtained values of the predictor variables

a = the regression constant

After an index number of the predicted proportion of handicapped students was calculated, the school divisions were placed on a frequency distribution. The national incidence proportion range was identified.

The difference between each school division's observed proportion and the proportion predicted by the model was

obtained. These difference scores, known as residuals, were standardized. School divisions with residuals greater or less than one standard deviation of the mean were identified.

A measure of effectiveness of the Index was obtained by the following ratio:

$$\text{Effectiveness} = \frac{\text{number of identified school divisions without significant residuals}}{\text{total number of school divisions}}$$

For example, if there are 110 school divisions where the difference between predicted proportion and actual proportion of handicapped falls within one standard deviation of one another out of a total of 131 school divisions studied, the index is 84 percent effective.

The next procedure developed a measure of efficiency of the Index.

$$\text{Efficiency} = \frac{\text{number of school divisions with proportions within the national incidence range}}{\text{number of school divisions predicted to have proportions within the national incidence range}}$$

For example, if the Index predicts 120 school divisions as having handicapped proportions within the national

incidence range and only 112 school divisions actually fall within this range, the Index is 93 percent efficient.

CHAPTER IV

RESULTS

Introduction

The relationships between the provision of special education services in Virginia school divisions and the economic and demographic characteristics of Virginia counties and selected cities were the focus of this investigation. The data analysis follows the research question formulated in Chapter 1. In addition to answering the a priori research question of the study, the collection and analysis of the data enabled the researcher to acquire information which will assist persons in positions of decision-making regarding provision of special education services. This chapter contains the following:

1. A master intercorrelation matrix of the nine indicator and five criteria variables.
2. A multiple regression analysis which attempts to determine the relative strength of the relationship between the proportion of students identified as handicapped and the nine indicator variables.
3. A discussion of the development and application of the Special Education Expectancy Index.
4. An examination of the variables as related to the proportion of students identified as mentally retarded, learning disabled, emotionally disturbed

and speech impaired. The relationships of the variables to the total proportion of students identified as handicapped were also studied.

Basic District Characteristics

The selected demographic and economic characteristics of the school divisions included the following: population per square mile, percentage of population in urban residence, percentage of black population, median school years completed, percentage unemployed, median household income, property value (a measure of wealth), average daily membership, and the Composite Index (a measure of fiscal capacity).

The Criteria Variables

The five dependent variables included in this study were the proportion of students identified as handicapped as well as the proportion of students identified as mentally retarded, learning disabled, emotionally disturbed, and speech impaired in 131 Virginia school divisions. A summary of these variables from 1984 child count data is found in Table 5.

Multiple Regression Analysis

Nine variables were selected as probable predictors of the proportion of students identified as handicapped in

Table 5: Summary Proportions of the Criteria Variables

Learning Disabled	4.30%
Mentally Retarded	1.88%
Emotionally Disburbed	.63%
Speech Impaired	3.28%
Total Handicapped	10.86%

Virginia school divisions. Five variables were the criterion measures which consisted of the proportion of a school division's population base receiving the special education services selected for study.

The coefficients of multiple correlation obtained by using the nine economic and demographic variables as predictors provided a maximum estimate of predictability. The coefficients of multiple correlation of the five criterion measures are set forth in Table 6. The F statistic is found on Table 6. These data confirmed a relationship between the dependent variable and the entire set of independent variables with the exception of students served as speech impaired.

The square of the correlation coefficient between the predicted score and the observed proportion was calculated. This coefficient of determination or R^2 is a measure of goodness of fit of this particular model by indicating the proportion of variance in the criterion score that can be explained by differences in the indicator variables. The indicator or independent variables selected for inclusion in the study accounted for approximately 36 percent of the variance of proportion of learning disabled students served, 36 percent of the variance of proportion of mentally retarded students served, 20 percent of the variance of proportion of emotionally disturbed students served, 9 percent of the variance of proportion of speech impaired students served,

Table 6: Coefficients of Multiple Correlation for Nine Indicator Variables on Criteria

Kinds of Services	Coefficients of Multiple Correlation	F statistic
Learning Disabilities	.60	7.65*
Mentally Retarded	.60	7.61*
Emotionally Disturbed	.44	3.26*
Speech Impaired	.30	1.30
Total Handicapped	.41	2.66**

*$p \leq .001$

**$p \leq .01$

and 17 percent of the variance of total proportion of students identified as handicapped served.

While a significant proportion of the variance was explained for four of five criteria measures, it should be noted that a large amount of unexplained variance exists. Other unaccounted indicator variables are presumably found in this unexplained variance. Caution is advised in strict interpretation of causal relationships.

The Indicator Variables

According to Hinkle (1979), deciding what magnitude of correlation coefficient indicates a noteworthy relationship is somewhat arbitrary. However, in a descriptive sense, Hinkle (1979) considers the following as a guide for interpreting correlation coefficients:

.90 to 1.00	(-.90 to -1.00)	Very high positive (negative) correlation
.70 to .90	(-.70 to -.90)	High positive (negative) correlation
.50 to .70	(-.50 to -.70)	Moderate positive (negtive) correlation
.30 to .50	(-.30 to -.50)	Low positive (negative) correlation
.00 to .30	(-.00 to -.30)	Little if any correlation

Inspection of the correlation matrix (Table 7) revealed that although most of the indicator variables had a low to moderate correlation with each other, there was a very high correlation (.95) between average daily membership and true valuation of property. The other two indicator variables exhibiting a high correlation were the percentage urban

Table 7: Master Intercorrelation Matrix of Nine Indicator and Five Criteria Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	1.000													
2	-.283	1.000												
3	.220	-.060	1.000											
4	.121	.117	-.087	1.000										
5	.297	-.175	.162	-.085	1.000									
6	.225	-.216	.228	-.201	.461	1.000								
7	.096	-.290	.279	-.253	.271	.759	1.000							
8	-.314	.385	.024	-.015	-.016	-.036	-.137	1.000						
9	.421	-.470	.312	-.116	.489	.517	.512	-.198	1.000					
10	-.423	.243	-.291	.068	-.262	-.101	-.107	.130	-.412	1.000				
11	.355	-.487	.303	-.163	.226	.220	.346	-.267	.580	-.561	1.000			
12	.140	-.261	.066	-.154	.230	.251	.284	-.087	.355	-.238	.527	1.000		
13	.048	.256	.045	-.139	.049	.199	.322	-.076	.294	-.173	.495	.946	1.000	
14	.735	.178	.312	.586	.189	.077	-.069	-.091	.176	-.288	.088	-.047	-.111	1.000

Key to Master Intercorrelation Matrix

1. Proportion of School Division Enrollment Identified as Learning Disabled
2. Proportion of School Division Enrollment Identified as Mentally Retarded
3. Proportion of School Division Enrollment Identified as Emotionally Disturbed
4. Proportion of School Division Enrollment Identified as Speech Impaired
5. Composite Index
6. Population Per Square Mile
7. Familes in Urban Residence, Percentage
8. Percent Black Population
9. Median School Years Completed
10. Total Civilian Labor Force, Percent Unemployed
11. Median Household Income
12. True Value of Property
13. Average Daily Membership
14. Proportion of School Division Enrollment Identified as Handicapped

residence and the population per square mile. These variables, by definition, are somewhat redundant. Their relationship is borne out with a coefficient of .76. Median grade completed was related to median income at .58. These two variables generally were more highly correlated with the other indicator variables.

There were nine indicator variables included in this study: average daily membership, composite index, percent black, median school years, percent unemployed, median income, true value of property, percent urban, and population per square mile. A summary of correlation coefficients and regression coefficients of these variables and of the five dependent variables are found in Table 8.

Services for the Learning Disabled

An examination of the t test of the regression coefficients obtained from the indicator, or predictor, variables for learning disabled services suggested that the proportion black population, percent unemployed, percent urban residence, median grade completed, and population per square mile each contribute significantly to the regression, the other independent variables being taken into account.

Predictor variables that have the largest beta weights, disregarding whether the beta weights are positive or negative, are the best predictors, conversely small beta weights indicate that the corresponding predictor variables

Table 8: Correlations and Coefficients of Multiple Correlation for Nine Indicator Variables on Criteria

Indicator Variables	Learning Disabled Services	Mentally Retarded Services	Emotionally Disturbed Services	Speech Impaired Services	Total Handicapped
1. Average Daily Membership	.05	-.26	.04	-.14	-.11
2. Composite Index	.30	-.17	.16	-.09	.19
3. Proportion Black Population	-.31	.38	.02	-.01	-.09
4. Percent Unemployed	-.42	.24	-.29	.07	-.29
5. Percent Urban	.09	-.29	.28	-.25	-.07
6. Median Grade	.42	-.46	.31	-.12	.18
7. Median Income	.35	-.48	.30	-.16	.09
8. Population	.22	-.22	.23	-.20	.08
9. Assessed Property Value	.14	-.26	.07	-.15	-.05
Multiple Regression Coefficients	.60	.60	.44	.30	.41

are not contributing to successful prediction as much as the other predictor variables, (Huck, Cormier, & Bounds, 1974). Examination of the beta weights in terms of predicting for Learning Disabled services revealed that the heaviest positive weights were on the population per square mile and true value of property. Negative beta weights were obtained for average daily membership, proportion of population black, percent unemployed, percent urban, and median grade completed (see Table 9).

Five variables yielded significant regression weights for predicting proportion of students served as learning disabled. The significant variables were precent black population, percent unemployed, percent urban residence, median grade completed, and population per square mile. (See Table 9.)

An index was developed to provide a comparative measure of the expectancy of a school division's proportion of learning disabled students. The computation of predicted scores allows a comparison of the likelihood of a school division to vary from national and/or state incidence figures for proportion of learning disabled students. The Expectancy Index score, also known as a predicted score, for each of 131 school divisions was obtained by determining the actual values of the indicator variables for each school division then using the obtained regression coefficients in a regression equation. The Expectancy Index scores for

Table 9: Beta Weights of Indicator Variables for Proportion of Students Served as Learning Disabled

Average Daily Membership	-.31
Composite Index	.01
Percent Black	-.25*
Percent Unemployed	-.25*
Percent Urban	-.28*
Median Grade	-.23*
Median Income	.08
Population per Square Mile	.26*
True Value of Property	.24

*p < .05

proportion of learning disabled students is presented in Appendix B.

Out of a total of 131 Virginia school divisions, 87 are predicted to fall below the national incidence rate of 4.57 percent for learning disabled students. Forty-four are predicted to fall above the national incidence rate. (See Figure 2.)

The difference between each school division's observed proportion of learning disabled students and the proportion predicted by the regression equation was obtained. These difference scores, known as residuals, were standardized. School divisions with residuals greater or less than one standard deviation of the mean were determined. In Figure 3 the number of school divisions per proportion range with significant differences is shown.

A closer inspection of these atypical school divisions revealed that 15 school divisions appeared to overidentify the proportion of learning disabled students and 15 school divisions apparently underidentified proportion of learning disabled students. (See Table 10.)

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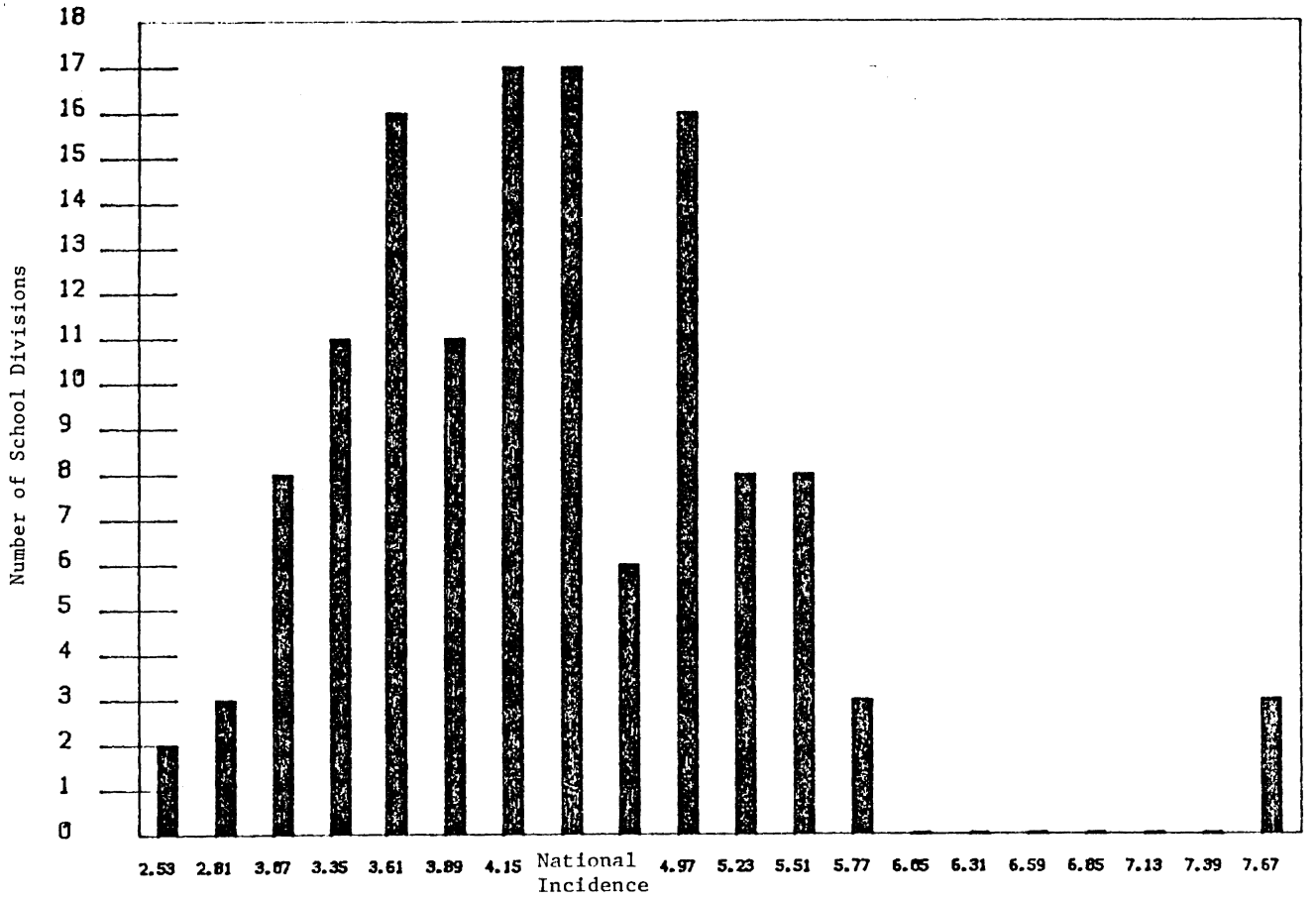

Figure 2. Expectancy Index Scores for Learning Disability Services

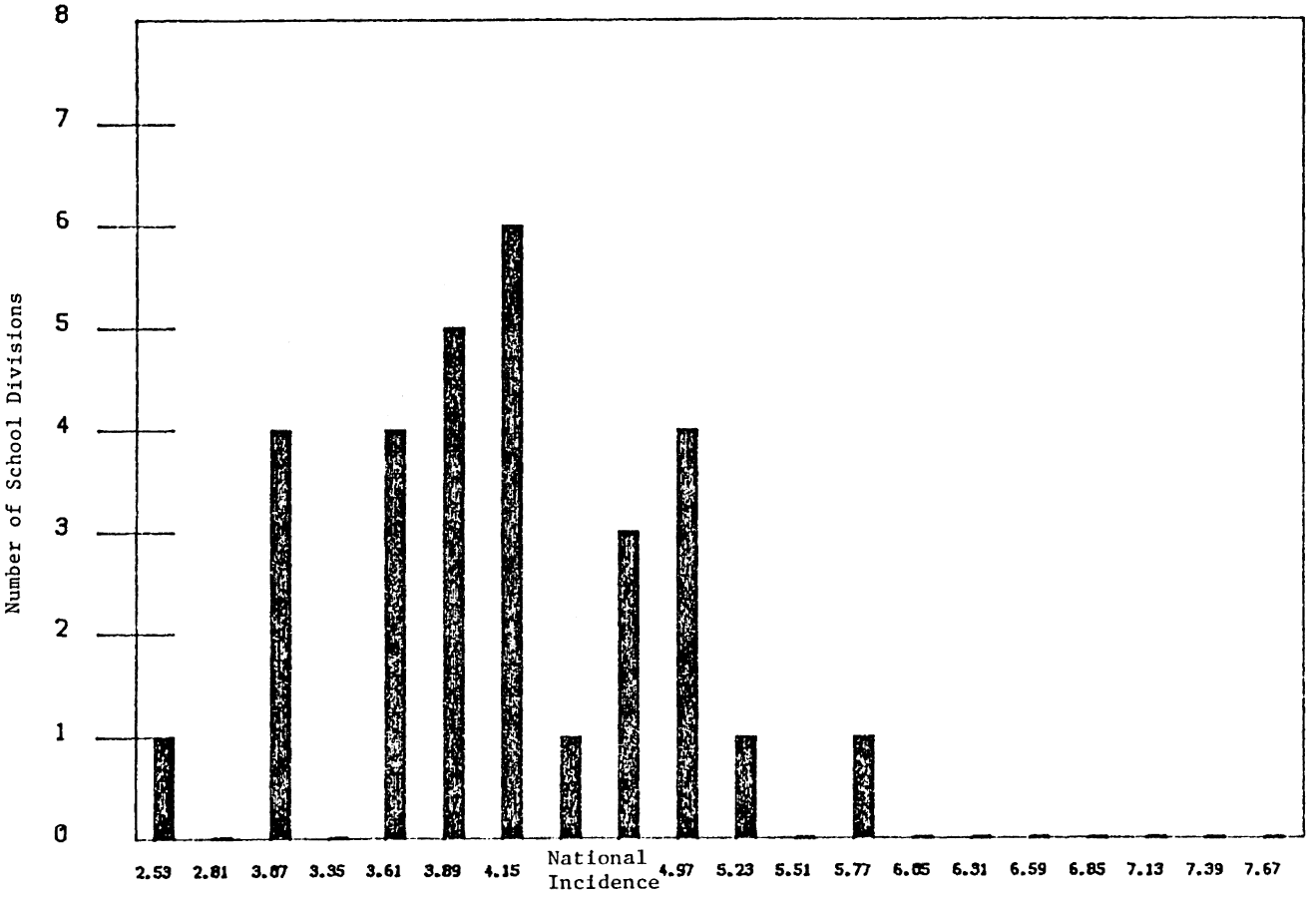

Figure 3. Expectancy Index Scores Not Equal to Actual Proportions for Learning Disability Services

Table I0: Comparison of School Division's Observed Scores and Index Scores

School Division	Proportion % Learning Disabled	Proportion % Mentally Retarded	Proportion % Emotionally Disturbed	Proportion % Speech Impaired	Proportion % Handicapped
Accomack			-		-
Albermarle		+	+		+
Amelia					+
Amherst		-	-		
Appomattox	-				
Arlington					-
Augusta					
Bath	+				
Bedford					
Bland	+				
Botetourt			-		
Brunswick	+	-			
Buchanan					
Buckingham			+		
Campbell	+				
Caroline					
Carroll	+	-	+	+	+
Charles City				+	
Charlotte	-				-
Chesterfield					
Clarke				-	
Craig	+	-		+	
Culpeper					
Cumberland					
Dickenson		-			
Dinwiddie					
Essex				+	
Fairfax					
Fauquier					
Floyd	+			-	
Fluvanna			-		
Franklin			+		
Frederick					
Giles		+	+	-	
Gloucester			+		

Table 10 (Cont'd.)

School Division	Proportion % Learning Disabled	Proportion % Mentally Retarded	Proportion % Emotionally Disturbed	Proportion % Speech Impaired	Proportion % Handicapped
Goochland	+				+
Grayson					
Greene			+	+	+
Greensville		-			
Halifax		-			
Hanover					
Henrico					
Henry	-			+	
Highland	+	+			+
Isle of Wight				-	-
King George		+			
King Queen				+	+
King William					
Lancaster	-				-
Lee					
Loudoun			-		
Louisa					
Lunenburg	-			-	-
Madison					
Mathews					
Mecklenburg	-			-	-
Middlesex					
Montgomery	+				
Nelson	-				-
New Kent			+		
Northampton					
Northumberland				+	+
Nottoway	+	+			+
Orange	-				
Page					
Patrick					
Pittsylvania					
Powhatan				-	
Prince Edward			-		
Prince George					

Table 10 (Cont'd.)

School Division	Proportion % Learning Disabled	Proportion % Mentally Retarded	Proportion % Emotionally Disturbed	Proportion % Speech Impaired	Proportion % Handicapped
Prince William					
Pulaski			+	+	-
Rappahannock					
Richmond					
Roanoke			+		
Rockbridge		+			
Rickingham					
Russell	-				
Scott					
Shenandoah					
Smyth				-	-
Southampton		+	+		+
Spotsylvania	-				
Stafford					
Surry		-	+		
Sussex	-	+			
Tazewell	-				
Warren				+	+
Washington		-		-	-
Westmoreland					
Wise				-	
Wythe					
York					-
Aleghany Highlands					
Alexandria				-	-
Bristol					
Buena Vista	-	+			
Charlottesville			+	+	+
Colonial Heights					
Covington	+		-	+	+
Danville					-
Falls Church			-		
Fredericksburg					
Galax			-		
Hampton			+		

Table 10 (Cont'd.)

School Division	Proportion % Learning Disabled	Proportion % Mentally Retarded	Proportion % Emotionally Disturbed	Proportion % Speech Impaired	Proportion % Handicapped
Harrisonburg					
Hopewell		+	+	+	
Lynchburg					
Martinsville		+	-		
Newport News					
Norfolk					
Norton		+	+		
Petersburg			+		
Portsmouth					
Radford			+		
Richmond City			+		
Roanoke City		+			
Staunton			-	-	
Suffolk					
Virginia Beach					
Waynesboro	-		-		-
Williamsburg					-
Winchester					-
South Boston	+	-			
Franklin City	+	-			
Chesapeake					
Lexington	-	-			
Salem					
Poquoson		-	+		
Manassas City					
Manassas Park	+			+	+

\- Observed score significantly less than Expectancy Index Score

\+ Observed score significantly more than Expectancy Index Score

School divisions with an actual proportion of learning disabled students significantly less than the predicted, or expected, proportion included:

Appomattox	Mecklenburg	Sussex
Charlotte	Nelson	Tazewell
Henry	Orange	Buena Vista
Lancaster	Russell	Waynesboro
Lunenburg	Spotsylvania	Lexington

School divisions with an actual proportion of learning disabled students significantly more than the predicted, or expected, proportion included:

Bath	Craig	Nottoway
Bland	Floyd	Covington
Brunswick	Goochland	South Boston
Campbell	Highland	Franklin City
Carroll	Montgomery	Manassas Park

Review of the geographic location of these atypical school divisions revealed that all but three county school divisions with actual proportions of learning disabled youngsters exceeding expected proportions are adjacent to at least one other "overidentified" county. The four city/town school divisions with actual proportions in excess of expected proportions are not located within counties having a like configuration. Counties apparently "underidentifying" the learning disabled population had nearly the same configuration. Three counties are not adjacent to any county having an actual proportion of learning disabled youngsters less than the expected, or predicted, proportion. Three city/town school divisions with a significant

underidentification of learning disabled youngsters are not geographically located within a county having the same characteristic.

Four school divisions, Bath, Bland, Campbell, and Montgomery, with apparent overidentification on the proportion of learning disabled were not either over or underidentified on any other criteria measure. Of the 11 other overidentified learning disabled school divisions, five were found to underidentify on the mentally retarded measure. Brunswick, South Boston, Franklin City, Craig, and Carroll fell into this group.

Appomattox, Orange, Russell, Spotsylvania, and Tazewell appeared to underidentify on the learning disabled measure. None of these school divisions over or underidentified on any of the other criteria measures. Of the ten counties that underidentified on the learning disabled measure and at least one other measure, six also apparently underidentified on the total proportion of handicapped measure. Lunenburg, Mecklenburg, and Waynesboro underidentified on the learning disabled measure and two other measures.

A measure of effectiveness and efficiency of prediction of learning disabled proportion was determined. Of the 131 school divisions, the Expectancy Index identified 101 as having a predicted proportion not significantly different from actual proportions. This rendered the Expectancy Index 77 percent effective. Effectiveness was defined as the

proportion of the total number of school divisions without significant differences between expected proportions and actual proportions of learning disabled students.

The measure of efficiency determined the Expectancy Index to be 83 percent efficient. Efficiency was defined as the proportion of the total number of school divisions with Index scores within the national incidence range and actual proportions within the national incidence range. Nineteen school divisions were observed to have actual proportions of learning disabled within the national incidence range and 23 school divisions were determined to have Expectancy Index scores within the national incidence range.

Services for the Mentally Retarded

The t test of regression coefficients for variables contributing significantly to the regression for predicting proportion of mentally retarded students revealed that the proportion of the population identified as black, the median grade completed, and median income contribute significantly to the regression when accounting for the other variables.

The correlation coefficients presented in Table 8 suggested that median income, median grade, and proportion of population black had the highest correlations. Composite Index had the lowest correlation.

Examination of beta weights for prediction of proportion of mentally retarded students showed the heaviest positive

weights on percent black population and true value of property. Negative beta weights were found for median grade completed, median income, population per square mile, and average daily membership. (See Table 11.) Significant beta weights were noted on percent black, median grade, median income, and population per square mile.

Each of the 131 school division's Expectancy Index Scores, or predicted proportion of mentally retarded, were calculated. The Index scores for the school divisions are in Appendix B. A graphic representation of Expectancy Index Scores, or predicted scores, for the 131 school divisions can be found in Figure 4. Sixty-nine school divisions are predicted to fall below the national incidence rate of 1.84 percent of students identified as mentally retarded. Sixty-two school divisions are expected to fall above the national incidence range.

The difference between each school division's observed or actual proportion of mentally retarded students and the proportion predicted by the regression equation was obtained. School divisions with standardized residuals greater or less than one standard deviation of the mean were identified. In Figure 5 the number of school divisions per proportion range with significant differences is presented.

School divisions exhibiting significant differences between Expectancy Index scores and actual proportion of mentally retarded students were examined. This inspection

Table 11: Beta Weights of Indicator Variables for Proportion of Students Served as Mentally Retarded

Average Daily Membership	-.24
Composite Index	-.03
Percent Black	.26*
Percent Unemployed	-.06
Percent Urban	.01
Median Grade	-.27*
Median Income	-.29*
Population per Square Mile	-.01*
True Value of Property	.23

*$p \leq .05$

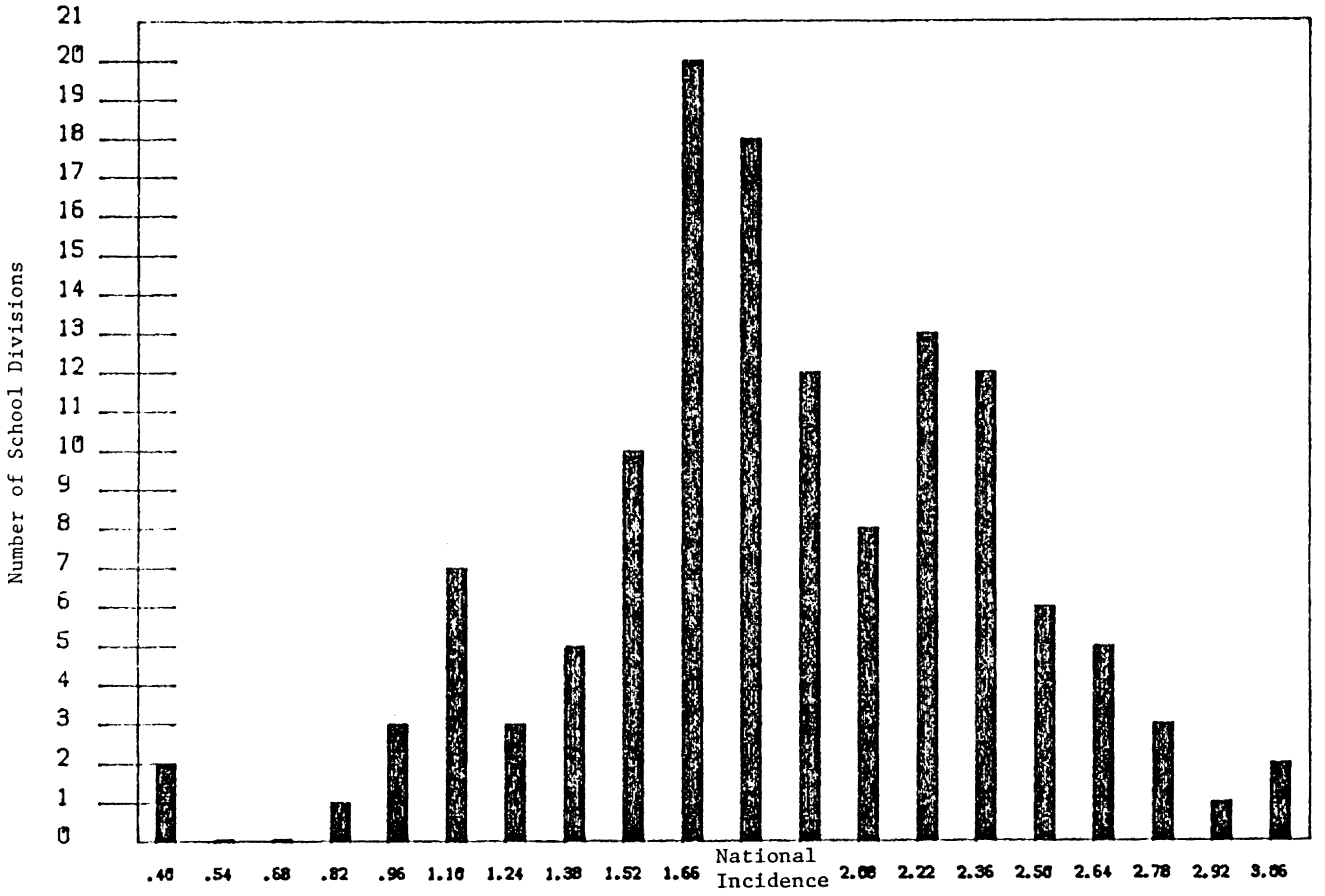

Figure 4. Expectancy Index Scores for Mentally Retarded Services

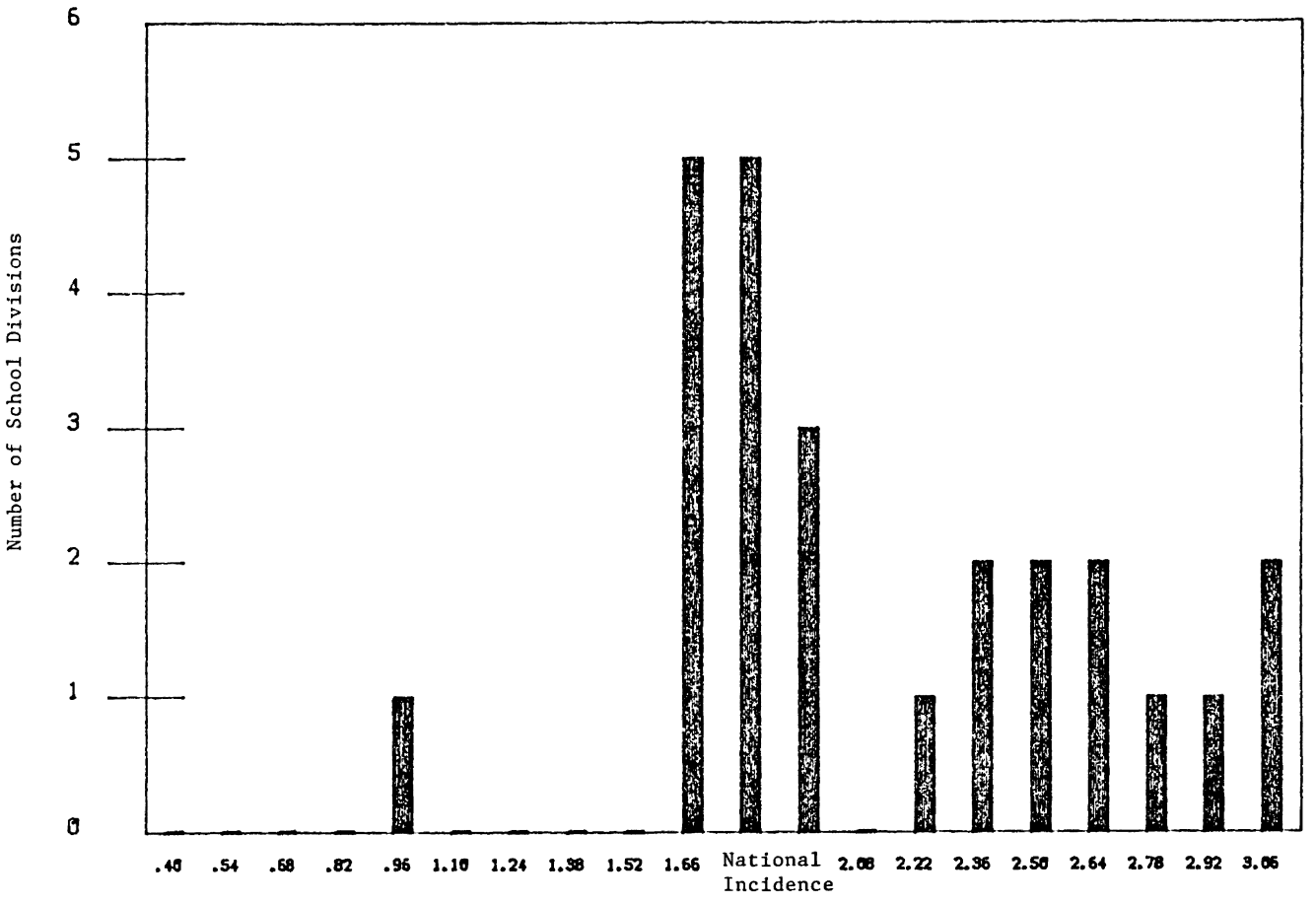

Figure 5. Expectancy Index Scores Not Equal to Actual Proportion for Mentally Retarded Services

revealed that 13 school divisions appeared to underidentify students who are mentally retarded. Twelve school divisions apparently overidentified the number of mentally retarded students. (See Table 10.)

School divisions whose actual proportion of mentally retarded students was significantly less than the expected score included:

Amherst	Dickerson	Lexington
Brunswick	Franklin County	Poquoson
Carroll	Greensville	Surry
Craig	Halifax	Washington
		South Boston

School divisions with an actual proportion exceeding the expected proportion of mentally retarded students included:

Buena Vista	Nottoway
Giles	Norton
Highland	Roanoke City
Hopewell	Rockbridge
King George	Southampton
Martinsville	Sussex

Atypical school divisions were widely scattered throughout the state. Little or no geographic pattern could be determined. Rockbridge County, an overidentified school division, contained Lexington, an underidentified school division and Buena Vista, an overidentified school division. Southampton, another overidentified school division, had within its boundaries Franklin, an underidentified school division. South Boston, located within Halifax County, was consistent with that county in underidentification.

Three school divisions apparently underidentified only mentally retarded students. Greensville, Dickenson, and Halifax presented actual proportions within expected proportions for the other four criteria measures of learning disabled, emotionally disturbed, speech impaired, and total percent handicapped. King George, Rockbridge, and Roanoke City overidentified only on the mentally retarded criteria measure.

Of the four school divisions that overidentified on the mentally retarded criteria measure and either over or underidentified on only one other measure, Sussex and Buena Vista underidentified on the learning disabled measure and Martinsville on the emotionally disturbed measure. Norton, the fourth, overidentified on the emotionally disturbed measure as well. Brunswick, South Boston, Franklin, and Craig underidentified on the mentally retarded measure and overidentified on the learning disabled measure.

Lexington underidentified on both the mentally retarded measure and the learning disabled measure. Poquoson and Surry underidentified on the mentally retarded measure and overidentified on the emotionally disturbed measure. Amherst underidentified on both mentally retarded and emotionally disturbed measures.

Seven school divisions over and/or underidentified on three measures. Of the seven, Hopewell, Southampton, Nottoway, and Highland overidentified on the mentally

retarded measure and two other measures. Washington underidentified on the mentally retarded measure and two other measures. Carroll underidentified on the mentally retarded measure and overidentified on learning disabled, emotionally disturbed, speech impaired, and total percent handicapped measures.

Application of the Effectiveness Index indicated that the Expectancy Index was 81 percent effective in identifying a school division's proportion of mentally retarded students. Of the 131 school divisions, 106 had an Expectancy Index score not significantly different from the observed proportion of mentally retarded students.

The Expectancy Index was 73 percent efficient in identifying school divisions with Index scores within the national incidence range. Twenty-two school divisions were observed to have proportions of mentally retarded students within the national incidence range and 30 school divisions were predicted to have Expectancy Index scores within the national incidence range.

Services for the Emotionally Disturbed

Examination of the t test of the regression coefficients obtained from the predictor variables for services for the emotionally disturbed suggested that the percent of the civilian labor force unemployed contributed significantly to

the regression, the other independent variables being taken into account.

The correlation coefficients were reviewed to ascertain the relative importance of indicator variables. Median grade completed and median household income had the highest absolute correlation. These variables were followed closely by percent of the civilian labor force unemployed and percent of population in urban residence. Percent black population, average daily membership, and assessed property value had the lowest correlations.

Scrutiny of the beta weights in Table 12 indicated that the heaviest positive weights were on the percent of families in urban residence and median household income. Highest negative beta weights were obtained for average daily membership and percent of the civilian labor force unemployed.

Expectancy Index scores for emotionally disturbed services were calculated for each of 131 Virginia school divisions (See Appendix B). The Expectancy Index score is a predicted score of the proportion of students per school division identified as emotionally disturbed. Figure 6 classifies the school divisions by Expectancy Index score. Of 131 Virginia school divisions, 116 are predicted to fall below the national incidence rate of 0.91% for emotionally disturbed students. Fifteen are predicted to fall above the national incidence percentage. The difference between each

Table 12: Beta Weights of Indicator Variables for Total Proportion of Students Served as Emotionally Disturbed

Average Daily Membership	-.21
Composite Index	-.03
Percent Black	.13
Percent Unemployed	-.17*
Percent Urban	.23
Median Grade	.10
Median Income	.19
Population per Square Mile	-.01
True Value of Property	.04

*$p \leq .10$

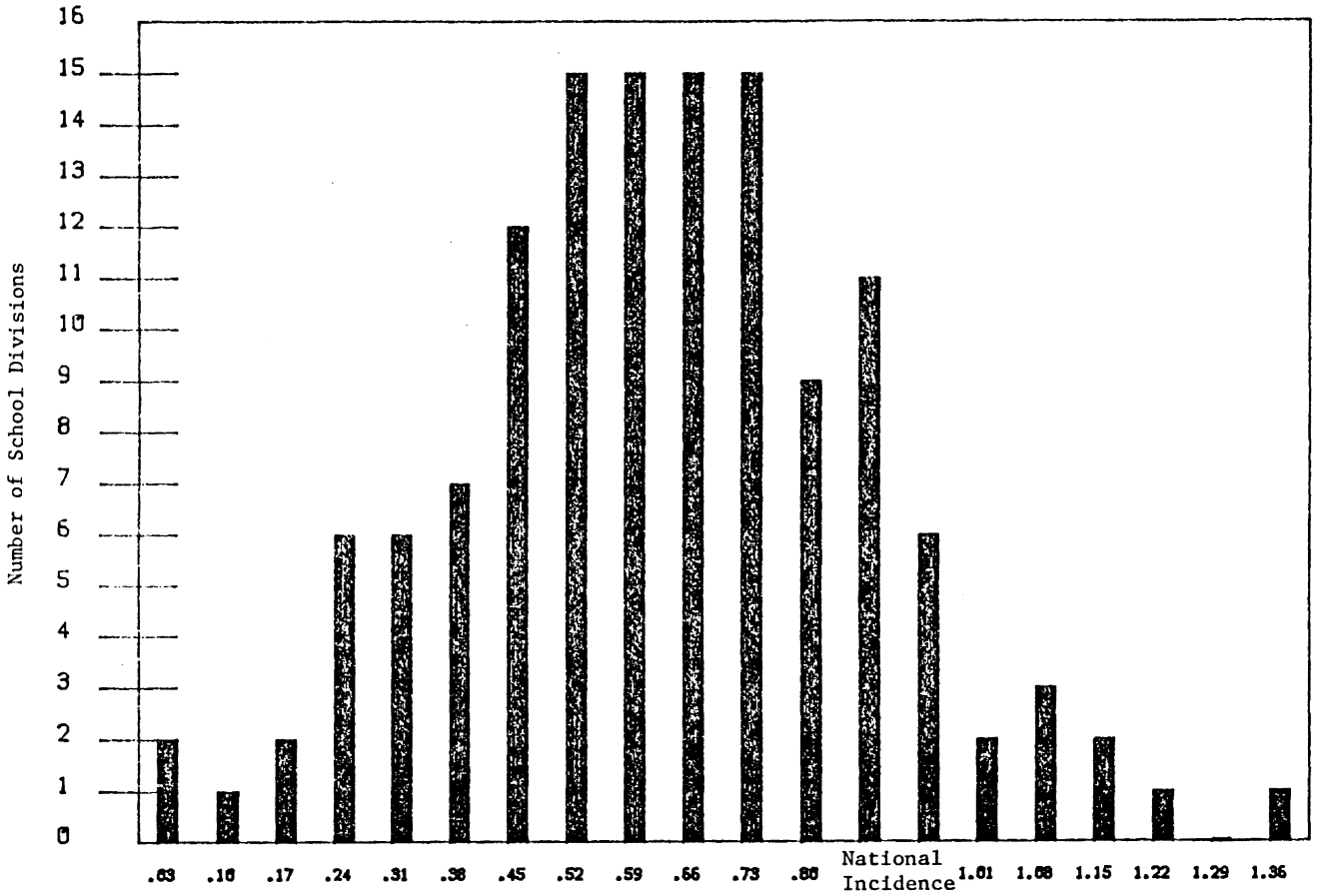

Figure 6. Expectancy Index Scores for Emotionally Disturbed Services

school division's observed proportion of emotionally disturbed students and the proportion predicted by the regression equation (i.e. Expectancy Index score) was obtained. The number of school divisions per proportion range of emotionally disturbed students with significant differences is found in Figure 7.

A review of Table 10 revealed that 19 school divisions seemed to overidentify the proportion of emotionally disturbed students. Eleven school divisions apparently underidentified the proportion of emotionally disturbed students.

School divisions with an actual, or observed, proportion of emotionally disturbed students significantly less than the Expectancy Index score included:

Amherst	Falls Church
Fluvanna	Galax
Loudoun	Martinsville
Prince Edward	Staunton
York	Waynesboro
Covington	

School divisions with an actual proportion of emotionally disturbed students significantly in excess of the Expectancy Index score included:

Albermarle	New Kent	Hampton
Carroll	Pulaski	Hopewell
Franklin	Roanoke	Norton
Giles	Southampton	Petersburg
Gloucester	Surry	Radford
Green	Charlottesville	Richmond
		Poquoson

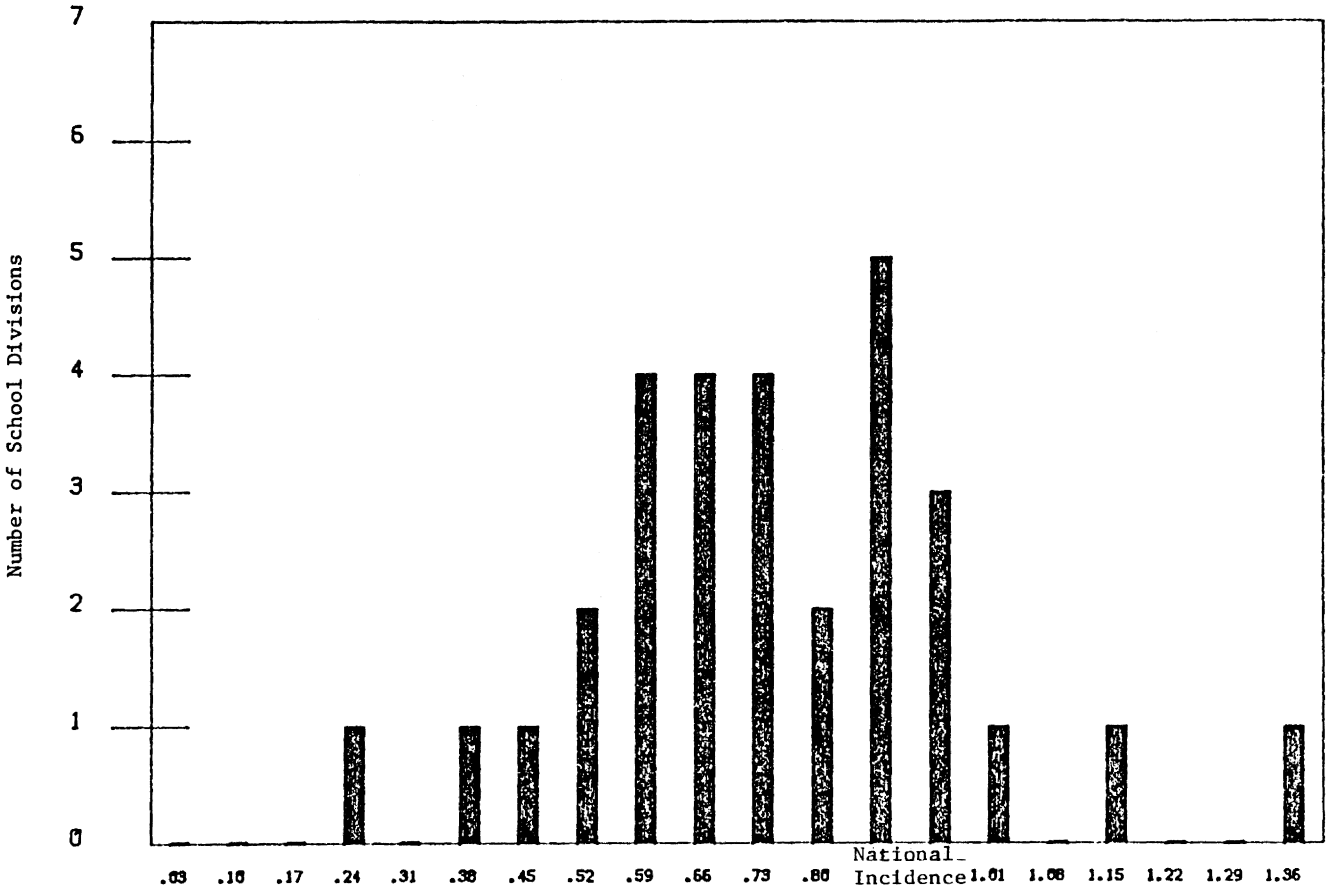

Figure 7. Expectancy Index Scores Not Equal to Actual Proportions for Emotionally Disturbed Services

County school divisions with apparent overidentification were geographically adjacent to at least one other county with overidentification. Poquoson is the only city/town school division with apparent overidentification located within a county school division underidentifying proportion of emotionally disturbed students. Galax school division was recognized as underidentifying but geographically being adjacent to both Carroll county, whose school division was found to overidentify, and Grayson county, with an actual proportion comparable to the predicted proportion.

Cities/towns were disproportionately noted with Expectancy Index scores significantly below or above actual proportions. Out of 19 school divisions found to exceed Expectancy Index scores, eight were city/town school divisions. Out of 11 school divisions with actual proportions significantly less than Expectancy Index scores, six were city/town school divisions. Richmond, Petersburg, Roanoke, Hampton, and Radford exceeded their Expectancy Index score only in the area of proportion of emotionally disturbed students along with county school divisions of Franklin, Gloucester, and New Kent. None of these school divisions were significantly different from their Expectancy Index score on any variable but proportion of emotionally disturbed students. Galax, Falls Church, Fluvanna, Loudoun, and Prince

Edward also appeared to underidentify only in the area of proportion of emotionally disturbed students.

A measure of effectiveness and efficiency of prediction of emotionally disturbed proportion was determined. Of the 131 school divisions, the Expectancy Index identified 101 as having a predicted, or expected, proportion not significantly different from actual proportions. This rendered the Expectancy Index 77 percent effective.

The measure of efficiency determined the Expectancy Index 53 percent efficient. Efficiency was defined as the proportion of the total number of school divisions with Expectancy Index scores within the national incidence range and actual proportions within the national incidence range. Nine school divisions were observed to have proportions of emotionally disturbed within the national incidence range and 17 school divisions were determined to have Expectancy Index scores within the national incidence range.

Services for the Speech Impaired

The t test of the regression coefficients obtained from the predictor variables for services for the speech impaired indicated that the regression weight for percent of population of urban residence contributed significantly to the regression, with the other independent variables being taken into account.

A review of the correlation coefficients in Table 8 revealed that the percent of population in urban residence, followed by total population, have the highest absolute correlations.

An inspection of the beta weights in Table 13 concluded that the significant positive weight was on average daily membership. Significant negative beta weights were obtained for true valuation of property and percent of population in urban residence.

Expectancy Index scores were calculated for each of 131 Virginia school divisions (Appendix B). The Expectancy Index for Speech Impaired is a predicted score of the proportion of identified speech impaired students per school division. Figure 8 classified the school divisions by Expectancy Index score.

Of 131 Virginia school divisions, 16 are predicted to fall below the national incidence rate of 2.86% for speech impaired students and 115 are predicted to fall at or above the national incidence percentage.

The difference between each school division's observed proportion of speech impaired students and the proportion predicted by the regression equation (i.e. Expectancy Index Score) was calculated. The number of school divisions per proportion range with significant differences is presented in Figure 9.

Table 13: Beta Weights of Indicator Variables for Proportion of Students Served as Speech Impaired

Average Daily Membership	.28*
Composite Index	.03
Percent Black	-.07
Percent Unemployed	.01
Percent Urban	-.27*
Median Grade	.10
Median Income	-.12
Population per Square Mile	-.01
True Value of Property	-.33*

*$p \leq .10$

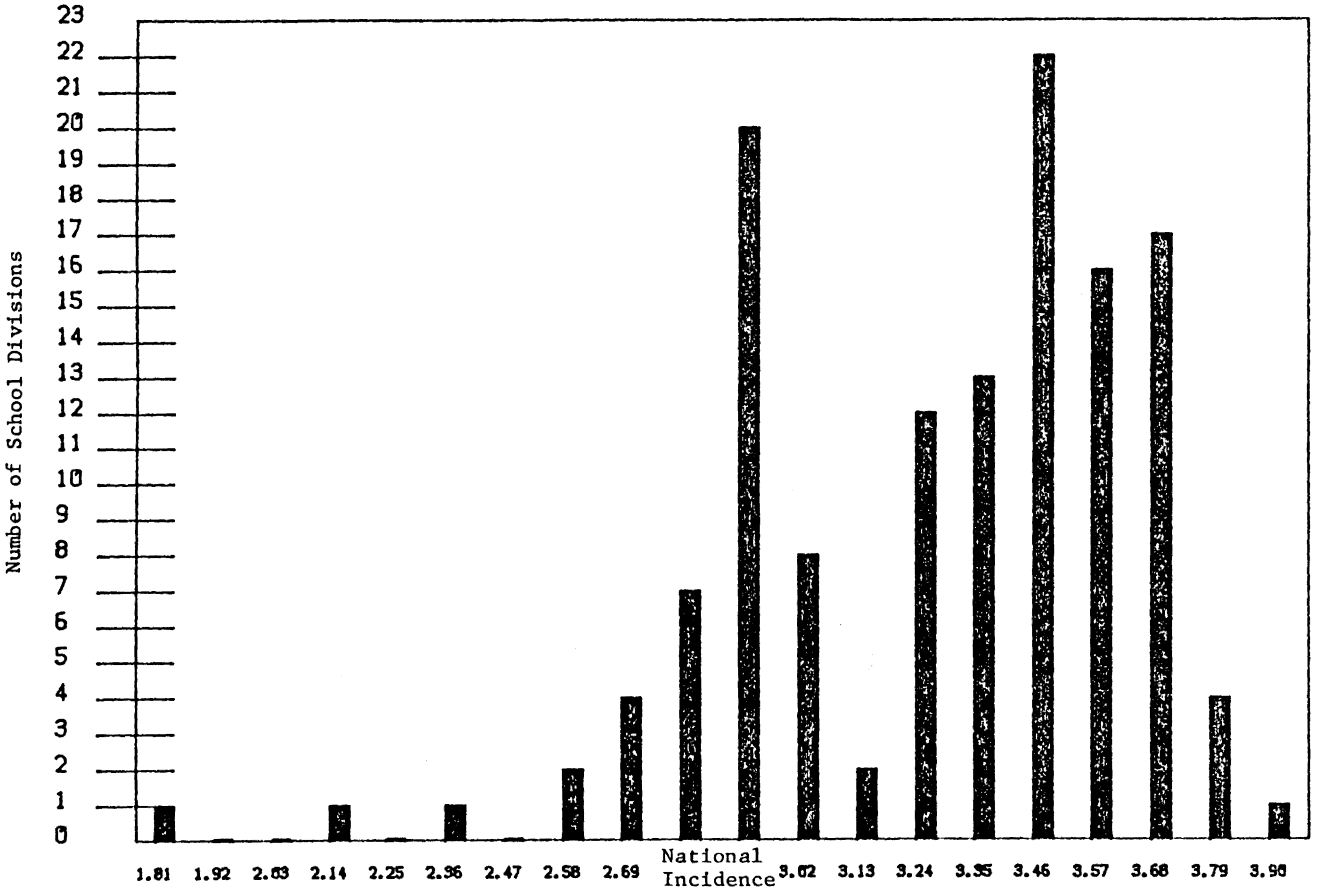

Figure 8. Expectancy Index Scores for Speech Impaired Services

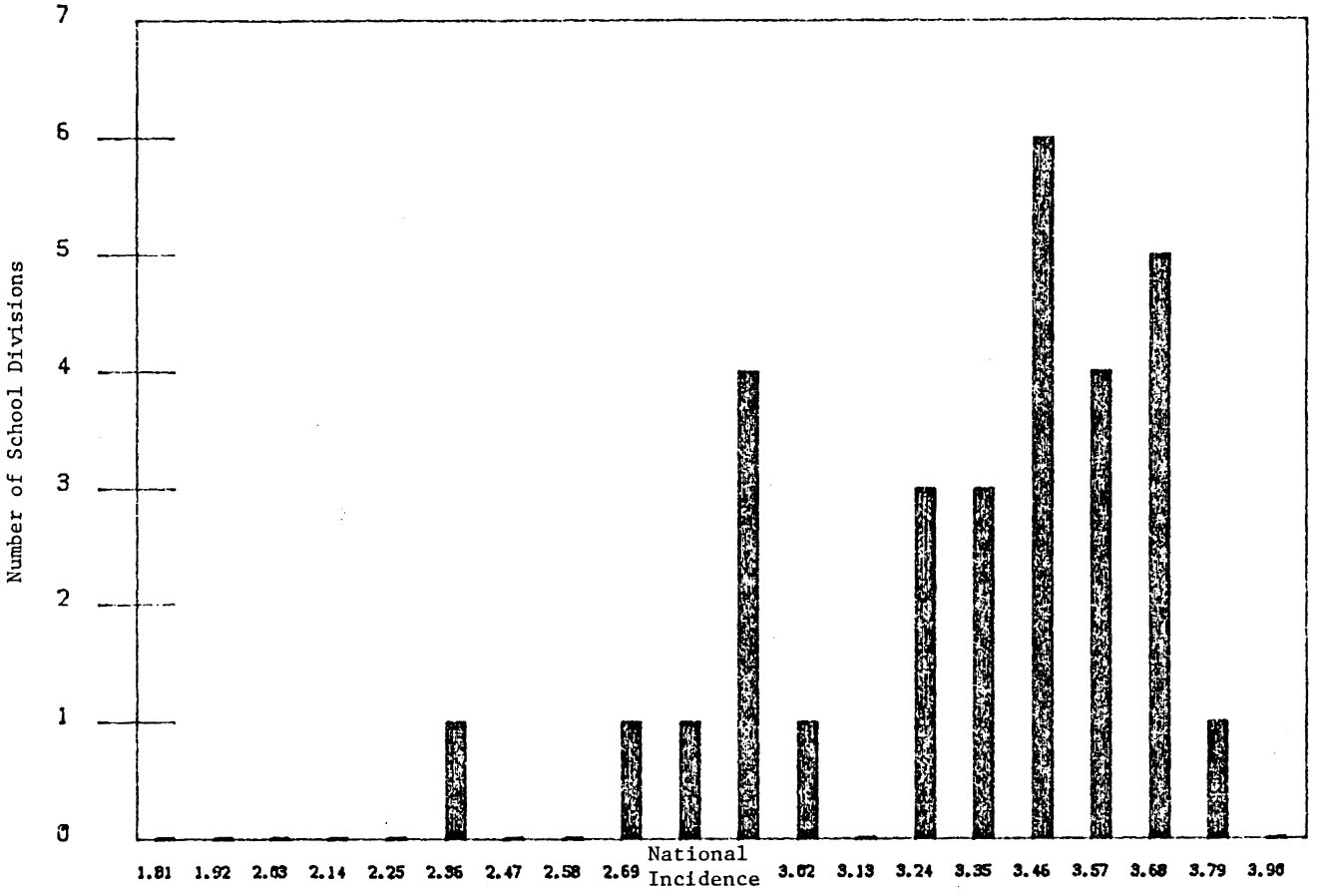

Figure 9. Expectancy Index Scores Not Equal to Actual Proportions for Speech Impaired Services

Sixteen school divisions apparently overidentified the proportion of speech impaired students. Fourteen school divisions seemed to underidentify the proportion of speech impaired students. (See Table 10.)

School divisions with an actual, or observed, proportion of speech impaired students significantly less than the Expectancy Index score included:

Accomack	Isle of Wight	Washington
Botetourt	Lunenberg	Wise
Clarke	Mecklenburg	Alexandria
Floyd	Powhatan	Staunton
Giles	Smyth	

School divisions with an actual proportion of speech impaired students significantly in excess of the Expectancy Index score included:

Albemarle	Essex	Pulaski
Buckingham	Greene	Warren
Carroll	Henry	Charlottesville
Charles City	King Queen	Covington
Craig	Northcumberland	Hopewell
		Manassas Park

Charlottesville was the only atypical city/town school division geographically located within an atypical county. No discernible pattern developed for any of the other atypical school divisions.

Cities/towns were disproportionately underrepresented with Expectancy Index scores significantly above actual proportions. Out of 14 school divisions found to exceed Expectancy Index scores, two were city/town school divisions.

In this study, city/town school divisions represented 29% of the total number of school divisions. The four city/town school divisions found to overidentify were roughly within the expected percentage. No city/town school division was identified as atypical only in the proportion of speech impaired students. City/town divisions were found to be atypical in at least one other exceptionality or in the total proportion of handicapped students identified.

Buckingham, Charles City, and Essex counties appeared to overidentify only in the proportion of speech impaired students. These school divisions were not significantly different from their Expectancy Index score on any variable but proportion of speech impaired students. Botetourt, Clarke, Powhatan and Wise apparently underidentified only in the area of proportion of speech impaired students.

A measure of effectiveness and efficiency of prediction of speech impaired proportion was determined. Of the 131 school divisions, the Expectancy Index identified 101 as having a predicted, or expected, proportion not significantly different from actual proportion. This made the Index 77% effective.

The measure of efficiency determined the Expectancy Index to be 81% efficient. Efficiency was defined as the proportion of the total number of school divisions with Expectancy Index scores within the national incidence ranges. Twenty-two school divisions were observed to have proportion

of speech impaired students within the national incidence range and 27 school divisions were determined to have Expectancy Index scores within the national incidence range.

Services for the Total Percent of the School Population Identified as Handicapped

Examination of the t test of the regression coefficients obtained from the indicator, or predictor, variables for total proportion of school population identified as handicapped suggested that the precent unemployed and percent in urban residence each contributed significantly to the regression, the other independent variables being taken into account.

Review of the correlation coefficients presented in Table 8 indicated that percent unemployed, composite index and median grade had the highest absolute correlations. Assessed value of property had the lowest correlation. Examination of beta weights in terms of predicting the total proportion of handicapped students revealed that the heaviest positive weight was on population per square mile. Negative beta weights were obtained for percent unemployed and percent urban. (See Table 14.)

Expectancy Index scores were again calculated for each of 131 Virginia school divisions (see Appendix B). The Expectancy Index for total handicapped is a predicted score

Table 14: Beta Weights of Indicator Variables for Total Proportion of Handicapped Students Served

Average Daily Membership	-.13
Composite Index	.05
Percent Black	-.09
Percent Unemployed	-.27*
Percent Urban	-.29*
Median Grade	.13
Median Income	-.06
Population per Square Mile	.21*
True Value of Property	.01

*$p \leq .05$

of the total proportion of the school population identified as handicapped per school division.

Of 131 Virginia school divisions, 76 are predicted to fall below the national incidence rate of 11% for a total proportion of identified handicapped students, and 55 are predicted to fall above the national incidence rate. (See Figure 10.)

The difference between each school division's observed proportion of handicapped students and the proportion predicted by the regression equation was obtained. The number of school divisions per proportion range with significant differences is found in Figure 11. Fourteen school divisions seemingly overidentified the total proportion of handicapped students. Seventeen school divisions noticeably underidentified the total proportion of handicapped students. (See Table 10.)

School divisions with an actual, or observed, proportion of handicapped students significantly less than the Expectancy Index score were:

Accomack	Mecklenburg	Alexandria
Arlington	Nelson	Danville
Charlotte	Pulaski	Waynesboro
Isle of Wight	Smyth	Williamsburg
Lancaster	Washington	Winchester
Lunenburg	York	

School divisions with an actual proportion of handicapped students significantly in excess of the Expectancy Index score included:

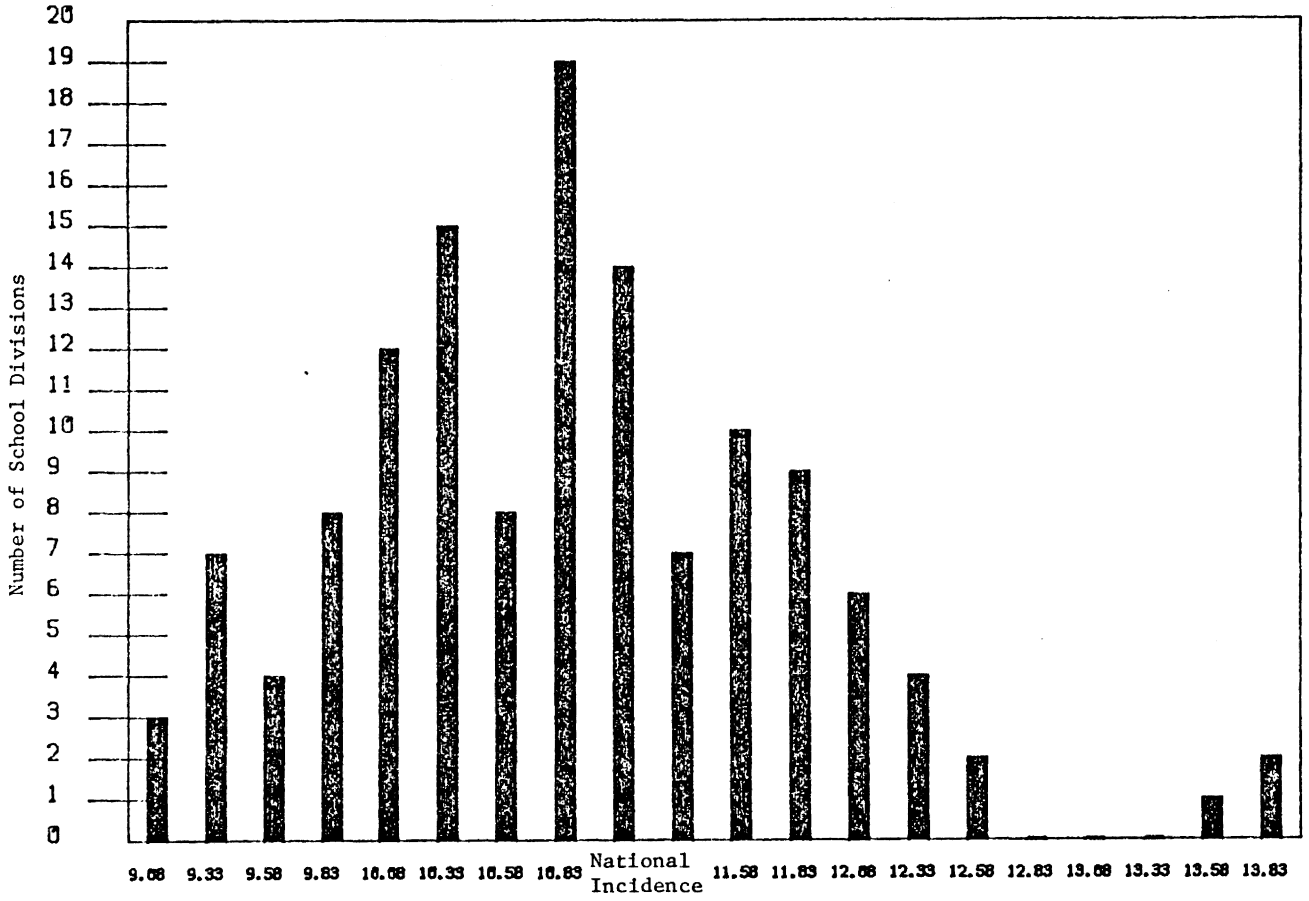

Figure 10. Expectancy Index Scores for Proportion of Total Handicapped

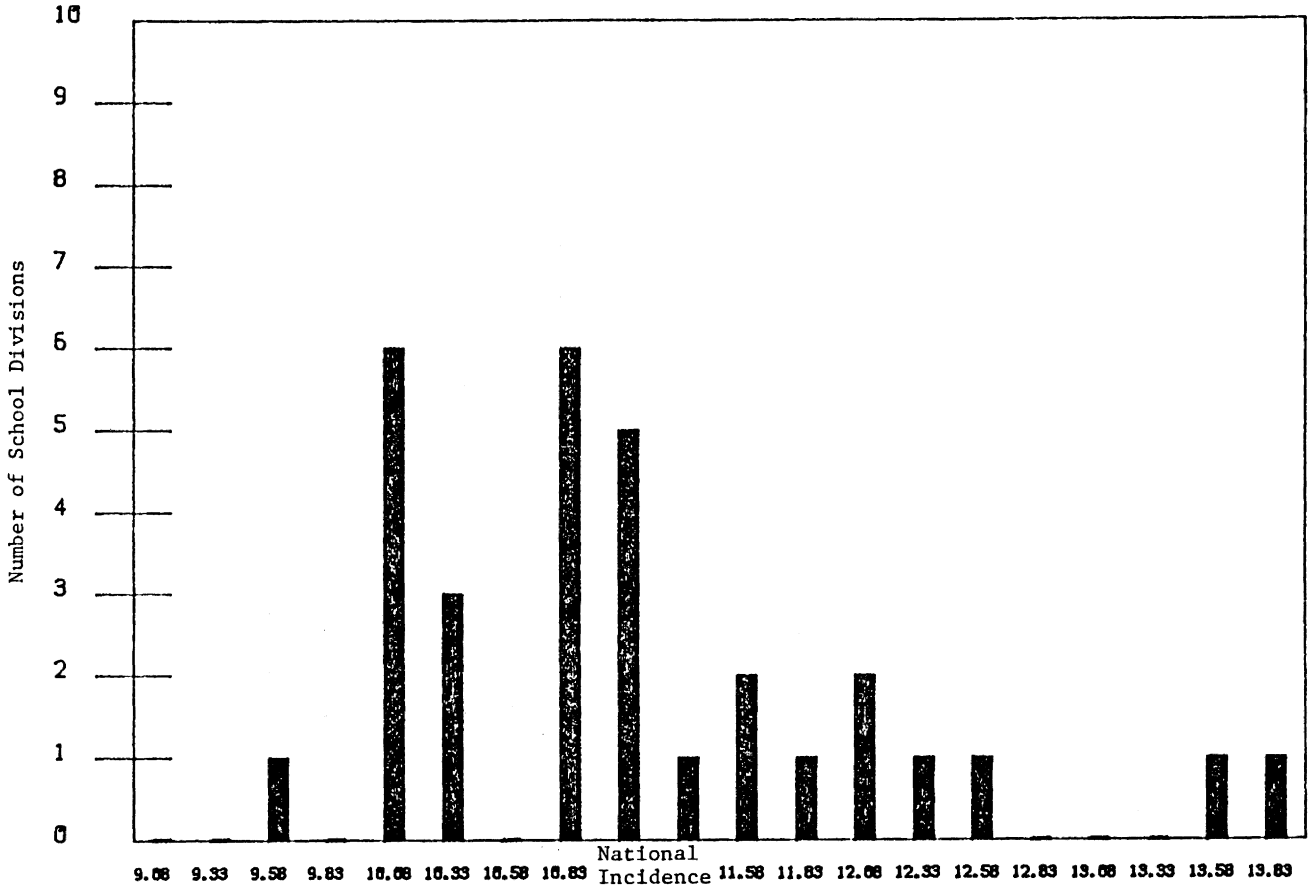

Figure 11. Expectancy Index Scores Not Equal to Actual Proportions of Total Handicapped

Albemarle	Highland	Warren
Amelia	King Queen	Charlottesville
Carroll	Northumberland	Covington
Goochland	Nottoway	Manassas Park
Greene	Southampton	

Atypical city/town school divisions were proportionately represented among the atypical school divisions. As previously noted in this study, city/town school divisions represented 29% of the total number of school divisions. The five city/town school divisions found to underidentify the total proportion of handicapped students represented 29% of the atypical school divisions. The three city/town school divisions found to overidentify represented about 21% of the atypical school divisions. Three city/town school divisions were found to underidentify the total proportion of handicapped students but presented no atypical results in any specific area of exceptionality. These included Danville, Williamsburg, and Winchester. Arlington was the only county school division to meet the same criteria. Amelia County was the only school division to overidentify the total proportion of handicapped students but not overidentify in any area of exceptionality.

Atypical city/town school divisions were mostly geographically located within counties that were not found to be atypical. Alexandria and Charlottesville were the exceptions. The counties adjacent to these cities were atypical in the same way that the cities were atypical.

Close inspection of the data revealed that Pulaski County was the most irregular case in that the county was found to underidentify in the total proportion of handicapped students but two areas of exceptionality were found to be overidentified, emotionally disturbed and speech impaired, and no areas of exceptionality were found to be underidentified. With the one exception previously noted (Amelia), all atypical school divisions overidentifying the total proportion of handicapped students also underidentified in at least one area of exceptionality (see Table 10).

A measure of effectiveness and efficiency of prediction of total proportion of handicapped students was determined. Of the 131 school divisions, the Expectancy Index identified 100 as having a predicted, or expected, proportion not significantly different from actual proportions. This rendered the Expectancy Index 76% effective.

The measure of efficiency determined the Expectancy Index to be 67% efficient. Efficiency was defined as the proportion of the total number of school divisions with Expectancy Index scores within the national incidence range and actual proportions within the national incidence range. Twenty-two school divisions were observed to have total proportions of handicapped students within the national incidence range and 33 school divisions were determined to have Expectancy Index scores within the national incidence range.

CHAPTER V

DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

The fundamental issue of this study was to establish that certain demographic and economic factors were related to the proportions of children identified as handicapped. The formation of this relationship establishes a rough "benchmark" against which school divisions can be measured. However, this is the first theoretical study using these indicator variables as predictors. While a significant amount of variance was accounted for, an even larger amount of possible variance has remained unaddressed.

For the administrator of special education, one of the most difficult problems is planning for service provision for identified handicapped children. If this administrator could have some idea of the general proportions of handicapped expected to be within the school division, it would allow program implementation to be systematically planned. It would be possible to gauge where within a state unserved, underserved, or "overserved" students are most likely found. Vastly different proportions of identified handicapped students between school divisions of similar demographic and economic characteristics may be due to real differences in

population proportions or may reflect differences in local service provision.

Using economic and demographic data to predict some aspect of service provision has been accomplished by Chalfant (1967), Marshman (1972), and Valentine (1980). The purpose of this study was to observe the distribution among school divisions of resources and characteristics represented by the selected variables, examine the associative relationships and predictive power among the variables and identify areas in need of future investigation.

Comparison to Previous Research

Chalfant's (1967) research conducted in the permissive era of special education programming produced conclusions regarding the nature of counties providing services for handicapped children. Chalfant (1967) found that the factor he called "urbanization" was the most important factor associated with the presence of special education services. This factor is a reflection of population, and Chalfant concluded that a large population base is necessary to provide sufficient numbers of children to establish special education programs.

Mandatory legislation providing for "zero reject" negated this finding. Population sufficient for establishing a class cannot be the basis for special education

programming. Close examination of school divisions that failed to identify the predicted proportion of handicapped students included densely populated cities (Alexandria) and counties (York) as well as sparsely populated counties (Nelson, Charlotte).

Chalfant (1967) also found that his "education factor" had implications for special education programming. He concluded that "one would expect counties with an educated populace to concern themselves with the education of their children." The current research found that less than half the school divisions failing to meet Expectancy Index scores for proportion of handicapped students exhibited median grade completed below the state median grade completed.

Chalfant (1967) further suggested that socio-economic status may implicate provisions for special education services. Mandatory legislation removed this as a legitimate consideration in providing general education programming. Again, fewer than half the school divisions failing to identify expected proportions of handicapped students had composite index scores, a measure of ability to pay, less than the state average.

A population growth factor was additionally cited by Chalfant's 1967 study as affecting special education services. He remarked that when the rate of population growth is reduced, the public school may be able to reduce the lag between need and services provided. Compulsory

compliance with federal and state statutes does not allow school divisions "lag" time today.

In comparing the indicator variables of the current study with Chalfant's (1967) research, several similarities emerge. Chalfant's 1965 study found a high degree of colinearity between total equalized assessed valuation of property and average daily attendance (.94). The present study sustained a high correlation of .95 between average daily membership and true valuation of property.

Close scrutiny of the current study's correlation matrix and Chalfant's 1967 correlation matrix indicated that the indicator variables have been refined as evidenced by generally lower correlations (Table 15). In all cases but one where Chalfant found a significant negative correlation, the present research yielded a negative correlation. The exception was the .271 correlation between composite index and percentage of families in urban residence. Chalfant's correlation on roughly similar indicator variables, equalized assessed valuation per child in average daily attendance and percentage of families in urban residence, was -.09.

The current study's criteria measures and Chalfant's criteria measures are not nearly as comparable as the indicator variables. Special services for students identified as learning disabled were not yet conceivable in 1967. In the current study, learning disabled students represented 4.3% of the total handicapped. Given the

Table 15: Comparison of Intercorrelation Matrices

	Composite Index	Population/Sq. Mile	% Urban Residence	% Black	Median School Years	% Unemployed	Median Income	True Value Property	ADM
Composite Index - Current	1.00								
Eq. Assessed Value/ADA - Chalfant									
Pop./Sq. Mile - Current	.46	1.00							
Pop./Sq. Mile - Chalfant	.02								
% Urban Residence - Current	.27	.76	1.00						
% Urban Residence - Chalfant	-.09	.61							
% Black Population - Current	-.02	-.04	-.14	1.00					
Nonwhite Population - Chalfant	-.21	.17	-.18						
Median School Years - Current	.48	.52	.51	-.19	1.00				
Median School Years - Chalfant	.27	.43	.41	-.13					
% Unemployed - Current	-.26	-.10	-.11	.13	-.41	1.00			
% Unemployed - Chalfant	-.27	-.17	-.27	.37	-.57				
Median Household Income - Current	.23	.22	.35	-.27	.58	-.56	1.00		
Median Income - Chalfant	.27	.71	.69	-.08	.70	-.54			
Total Value Property - Current	.23	.25	.28	-.09	.35	-.24	.53	1.00	
Total Eq. Assessed Value - Chalfant	.21	.93	.60	.11	.50	-.25	.77		
ADM - Current	.05	.19	.32	-.08	.36	-.17	.50	.95	1.00
ADM - Chalfant	.03	.95	.69	.18	.50	-.20	.77	.94	

probable differences in definition among the various handicapping conditions, it is interesting to note that Chalfant's study enjoyed a significantly higher relationship between indicator variables and services for speech impaired students (.66) than the current study's .30.

Application of Chalfant's methodology for developing Expectancy Index Scores, applying the scores to develop an Expectancy Index, and an Efficiency Index produced analogous results in the current study. Comparison of data from Table 16 suggested that this study succeeded in establishing a relationship between certain demographic and economic variables and the proportions of children identified as handicapped.

Marshman's study completed in 1972 utilized basic school division characteristics in a systems model approach. School division characteristics were considered as the resources for establishment and maintenance of a special education program. Marshman (1972) found that total enrollment was the most important component in the context of special education. The current study found average daily membership to be useful in predicting proportions of emotionally disturbed and speech impaired students in a school division but less useful in predicting proportions of mentally retarded, learning disabled, and total handicapped.

The previous empirical investigation by Marshman (1972) concluded that a base of 3,000 students is the minimum

Table 16: Comparison of Effectiveness and Efficiency

Special Service	Maximum Percentage: Effectiveness	Efficiency
Chalfant		
Deaf	82	75
Speech Correction	94	83
Elementary Classes for Educable Mentally Handicapped	94	84
Secondary Classes for Educable Mentally Handicapped	50	55
Director	71	81
Current Study		
Learning Disabled	77	83
Mentally Retarded	81	73
Emotionally Disturbed	77	53
Speech Impaired	77	81
Total % Handicapped	76	67

desirable size for a school division to provide special education services. Fifty-two of the 131 school divisions in Virginia included in the present study exhibited average daily memberships less than 3,000. Of the 42 school divisions in the study exhibiting observed scores either over and/or under Index Scores in at least two areas, 22 were school divisions with less than 3,000 enrollment. From these data one could surmise that size continues to be an important consideration in special education programming.

Marshman's research further concluded that high socioeconomic status had a depressing effect on program size, especially educable mentally retarded. This study supported the finding that median income is not a useful predictor for proportions of mentally retarded and total handicapped. It is marginally useful as a predictor for proportion of learning disabled.

Marshman (1972) found that special education was expanded, diminished, or diversified on bases other than wealth. He concluded that school districts did not utilize local wealth in support of special education. The current study found that of the previously identified 42 atypical school divisions, 26 were below the state average on the measure of ability to pay, the Composite Index. It would appear that if a school division is found to be atypical that school division would most likely have a composite index score below the state average.

Valentine's 1980 study examined the relationship between selected demographic characteristics of Florida school districts and planned district expenditures of Public Law 94-142 appropriations. The selected demographic characteristics of the school districts were size of the district, wealth of the district, percentage of handicapped children in the district, and percentage of minority handicapped children in the district. Three significant correlations were determined in Valentine's study. These correlations were between district size and indirect costs, between percentage of minority handicapped and expenditures for materials/supplies, and between district wealth and purchased services. The measure for wealth in Valentine's 1980 study was assessed valuation of property per full-time equivalent student. The present study found that of the 42 atypical school divisions, 40 had true value of property less than the state average. The conclusion could, therefore, be made that if a school division is found to be atypical, there is a strong probability that school division's true value of property is less than the state average. Using average daily membership as a comparable measure of size, the present study found that 38 out of the 42 atypical school divisions fell below the state average for average daily membership.

Previous research supported the use of demographic and economic variables in predicting aspects of special education programming. The pattern of the relationship was unclear,

however. This study confirmed that relationships exist between certain indicator variables and criteria measures.

Relationship Between Criteria Measures and Indicator Variables

The central focus of this study was to identify factors associated with the provision of special education services. Surprisingly, local composite index values were not found to have a significant correlation with any of the five criteria measures. The conclusion, therefore, is reached that a school division's measure of ability to pay does not relate to the proportions of students identified as mentally retarded, learning disabled, emotionally disturbed, speech impaired, or total proportion of all handicapped students. Other indicator variables exhibiting a low correlation with criteria measures include true value of property and average daily membership.

For actual proportions of students identified as learning disabled, four indicator variables enjoyed significant associative relationships. Median grades completed had a negative relationship to this criteria measure as did percent urban, percent unemployed, and percent black. A school division's proportion of learning disabled students appeared to be influenced by having an educated nonblack populace with a low level of unemployment in a nonurban area.

For actual proportions of students identified as mentally retarded, four indicator variables were significant. Percent black had a positive relationship to the criteria measure. Median grade completed, median income, and population per square mile showed a negative relationship. A school division's proportion of mentally retarded students was influenced by having a high percent black population with a low level of education and income and a sparsely populated area.

The significant positive relationships between proportions of students identified as emotionally disturbed and the indicator variables were found in percent urban and median income. A significant negative relationship was found in average daily membership. A school division's proportion of emotionally disturbed students was influenced by the degree to which the school division is urban, having a relatively high income with a low average daily membership.

Proportion of speech impaired students was not significantly correlated with any of the indicator variables. A low negative correlation was found with percentage of families in urban residence. This suggested that proportion of speech impaired students may be higher in more rural areas. However, something other than the indicator variables used account for the significant unexplained variance for proportion of speech impaired students. Speech impairment may be more a reflection of a physical disability.

The total proportion of students identified as handicapped shows a low negative correlation with the percentage of total civilian labor force unemployed. The total proportion of handicapped students was significantly and positively related to the population per square mile. Significant negative indicator variables were percent unemployed and percent urban. A high proportion of a school division's students were found handicapped if that school division was densely populated, exhibited low unemployment, and was not classified as urban.

The significant correlations noted may account for some school division's departure from national prevalence percentages in certain areas of disability and in total proportion identified as handicapped. School divisions with significantly atypical measures on certain indicator variables would reasonably be anticipated to differ from national, and even state, incidence/prevalence percentages. However, the extent of the difference from national incidence percentages are not extreme. For example, in a hypothetical school division of 1,000 students, 42 students would be reasonably expected to be identified as mentally retarded according to national incidence figures. In this study, school divisions ranged mostly from 25 students to 58 students identified as mentally retarded per 1,000 student population. (See Figure 2.)

In the development of the Expectancy Index, these anticipated differences have been taken into account. School divisions identified as atypical in that Expectancy Index Scores differ from actual proportions exhibited differences for reasons other than those measured by the indicator variables.

Indicator Variables and Expectancy Index Scores

The present study found certain indicator variables to be more useful in developing Expectancy Index scores than others.

Expected proportions of mentally retarded students were best found using the indicator variables of percent black population, median school years completed, median household income, and population per square mile. These indicator variables had the largest beta weights, thus they were the best predictors.

Expected proportions of students identified as learning disabled are best calculated using population per square mile, percentage of families in urban residence, percent black population, median school years completed, and percent of total civilian labor force unemployed. These were the indicator variables with significant beta weights.

Expectancy Index scores for a school division's proportion of students identified as emotionally disturbed should utilize percentage of families in urban residence,

percent of total civilian labor force unemployed, median household income, and average daily membership. Significant beta weights were determined for these indicator variables.

To obtain the Expectancy Index Scores for proportion of students identified as speech impaired, the most applicable indicator variables included percentage of families in urban residence, true value of property, and average daily membership. While these indicator variables exhibited significant beta weights, the indicator variables as a whole did not explain a significant amount of the total possible variance associated with identifying students in need of speech services.

Calculation of a school division's Expectancy Index Score for the total proportion of students identified as handicapped should include indicator variables of population per square mile, percentage of families in urban residence, and percent of total civilian labor force unemployed. These three indicator variables showed significant beta weights.

Considering the nine indicator variables' contribution to development of the Expectancy Index Scores, it is suggested that Composite Index and true value of property contribute least. Percentage of families in urban residence, percent black population, and median school years completed all contributed significantly to the Expectancy Index and are, therefore, the most useful as predictors.

The conclusion is reached that these nine indicator variables are useful as predictors for proportions of learning disabled, mentally retarded, emotionally disturbed and total handicapped, but were not significant for proportion of speech impaired.

Implications for the Implementation of Special Education Programs

Mandatory legislation provides that special education services be provided to identified handicapped children in the least restrictive environment. The continuum ranges from provisions within the local school division to informal agreements with adjacent school divisions, formal joint agreement plans, interagency plans, and/or tuition to private schools. The variety of means available to implement Public Law 94-142 in a local school division may affect the proportion of students identified as handicapped within that school division.

School divisions identified as atypical in the present study should be carefully scrutinized programmatically. The school division may have a regular education program that meets the needs of some students so well that they are not identified as handicapped. The reverse of the preceding may be true--the regular education program may be structured so that even a predisposition to a handicap may interfere with a child's learning. The atypical school division may

overidentify or underidentify in one area of exceptionality at the expense of another area of exceptionality. Local interpretation of state definitions for eligibility may be reflected in significant difference scores.

Locally specific influences may severely affect the proportions of handicapped students. These influences may include the presence or absence of parent advocacy groups, presence of a university hospital or school, an active, private clinical psychologist, transportation availability, and migration to perceived "strong" special education programs. Other reasons for a school division to be identified as atypical should be explored. General administrative "attitude" toward special education may cause spuriously high or low Expectancy Scores. A school division experiencing an inordinate number of due process hearings may react by over- or underidentification. The strength of joint agreements may be a factor. If a school division has a set number of "slots" in a jointly operated program, then perhaps the number of students identified as in need of that program is limited. Chalfant's (1967) research suggests that the presence or absence of an administrative position for special education has program implications. The experience and job description of the administrator for special education may also be a factor.

Characteristic of this ex post facto study was the ability of the researcher to build only strong inferences

about the relationship of the variables studied rather than cause effect conclusions. These inferences were based on the presence of significant beta weights and coefficients of multiple correlation.

Recommendations for Further Research

The results of this study have several important implications for further research. Consideration of the restricted empirical research which has been conducted on factors related to special education, and the limitations of the present study accentuate the need to continue to conduct empirical studies in this area of inquiry.

A logical extension of this study would be the refinement of the indicator variables. Additional variables may improve predictability. Utilization of variables identified as significant in the present study with other logical variables is one such extension. It is also suggested that data for the selected indicator variables be gathered for a period of five to six years. A regression equation generated from this aggregate would likely explain more variance and implicate strong indicator variables.

The current study validated an operational model by which school divisions can be compared. Application of this model in other states for purposes of cross validation would determine whether or not the same factors can be used to identify atypical school divisions in other states with the

same degree of efficiency and effectiveness as they did in Virginia and in Chalfant's 1965 study in Illinois.

Further research should be conducted on investigating the school divisions identified as atypical. A case study of a school division found to be extremely atypical, such as Carroll county, may suggest variables for future research.

Additional research is needed in identifying variables that are operating in atypical school divisions that remain unexplained by this study. This might include such variables as the certification of special education teachers, certification of the administrator of special education, history of litigation concerning special education programs, involvement of parent advocacy groups, proximity to university programs and/or hospitals for the handicapped, local leadership or community attitudes that act to stimulate or repress specialized programs for application of the definitions for certain handicapping conditions.

The Expectancy Index is applicable in comparative intra-state and/or inter-state studies. A study of this type would contribute objective data for evaluating the efficacy of different programmatic and/or administrative approaches to solving the challenge of providing a free appropriate education in the least restrictive environment. A means for identifying atypical school divisions has been proposed.

Results from this study suggested that the indicator variables were not useful for prediction of proportion of

students identified as speech impaired. Research should attempt to explain this finding and determine factors related to the identification of speech impaired students. There is always a degree of imperfection in a study of this type. In this study, the range in which Expectancy Index scores may vary is referred to as the error of measurement, which is considered to be an index of imperfection. Thus, in the case of proportion of speech impaired students, if actual proportions are extreme, they have on the average a greater probability of shifting toward the mean for a distribution because the scores are at the extreme of the distribution. This holds true for any change in the sample studied, the time frame in which the study occurred, and/or characteristics of the sample studied.

Summary

This study examined the relationship of certain economic and demographic variables and the provision of special education in Virginia school divisions. The mandate to provide special education programs became effective in the late 1970's. During the era of permissive legislation prior to that time, Chalfant, in 1967, established economic and demographic factors for use in predicting the existence of special education programs. This study sought to validate Chalfant's factors and determine their usefulness in relation to special education programs today. Since provision of

special education is now mandatory, this study utilized the factors to predict the proportion of the total school enrollment that are served in special education programs.

Indicator variables selected for inclusion in the study were average daily membership, population per square mile, median school years completed, percentage of total civilian labor force unemployed, true value of property, percent black, median household income, percentage of families in urban residence, and the Composite Index. Criteria measures included the proportion of students identified as mentally retarded, learning disabled, speech impaired, emotionally disturbed and total proportion of all handicapped students.

The intercorrelations of the nine indicator variables and five criteria measures for 131 school divisions revealed that local ability to pay, as measured by the Composite Index, true value of property, and average daily membership were not significantly correlated to the criteria measures studied. Indicator variables found significant to the proportion of learning disabled students were median school years completed, percent of the total civilian labor force unemployed, percent black, and percent urban. Median school years completed, median household income, population per square mile, and percent black were found to correlate to the proportion of students identified as mentally retarded. Indicator variables related to the proportion of students identified as emotionally disturbed included percent urban,

median income, percent of total civilian labor force unemployed, and average daily membership. A low correlation was found between proportion of speech impaired students and percentage of families in urban residence, true value of property, and average daily membership. The total proportion of students identified as handicapped showed a correlation with the percent of total civilian labor force unemployed, percent urban, and population per square mile.

The coefficients of multiple correlation obtained by using the nine indicator variables provided a maximum estimate of predictability. These data confirmed a linear relationship between the criteria measures and the indicator variables with the exception of students identified as speech impaired.

A special education Expectancy Index was developed. This Expectancy Index provided a numerical prediction of proportions for the five criteria measures for each of 131 school divisions. This Index score provided a comparative measure for each school division on each criteria measure. The score allowed each school division to examine its relationship with state and national prevalence percentages and with one another. School divisions with Expectancy Index scores significantly different from actual proportions were identified as atypical. The atypical school divisions were further diagnosed as having overidentified or underidentified

proportions of each criteria measure. The geographic location of each atypical school division was examined.

The effectiveness and efficiency of the Expectancy Index in identifying proportions of the five criteria measures was evaluated. Measures of effectiveness and efficiency of prediction were determined. Effectiveness was defined as the proportion of the total number of school divisions without significant differences between expected proportions and actual proportions of the criteria measures. Efficiency was defined as the proportion of the total number of school divisions with Expectancy Index scores within the national incidence range and actual proportions within the national incidence range for each disability area studied. Overall results revealed the Expectancy Index to be useful as a predictor for each of the five criteria measures.

Some of the indicators were more useful as predictors than others. Composite Index was not useful as a predictor of any of the criteria measures. True value of property was useful for only four of the five criteria measures. Percentage of families in urban residency, percent black population, and median school years completed all contributed significantly to the Expectancy Index.

The current study refined the indicator variables first identified by Chalfant (1967) in the era of permissive programming. The study confirmed the methodology utilized by Chalfant and yielded an operational model for predicting

certain special education services. A need for further investigation into the factors affecting the proportions of students identified as speech impaired has been determined.

Bibliography

Abeson, A. (1972). Movement and momentum: Government and the education of handicapped children. Exceptional Children, 39, 63-66.

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

Burello, L. C., & Sage, D. D. (1979). Leadership and change in special education. Englewood Cliffs, NJ: Prentice-Hall, Inc.

Burgdorf, A. History of unequal treatment: The qualifications of handicapped persons as a 'suspect class' under the equal protection clause. 15 Santa Clara Law 868 (1975).

Chalfant, J. C. (1967). Factors related to special education services. Washington, DC: Council for Exceptional Children.

Children's Defense Fund. (1974). Children out of school in America. Cambridge, MA: Author.

Commonwealth of Virginia (1985). Facing up 19: Statistical data on Virginia's public schools. Richmond: Division of Management Information Services, Department of Education.

Conant, J. B. (1959). The American high school today. New York: McGraw-Hill.

Education Amendments of 1974, Public Law 93-380, August 21, 1974.

Education for All Handicapped Children Act, Public Law 94-142, November 29, 1975.

Education for the Handicapped Act, Public Law 91-230, April 13, 1970.

Elementary and Secondary Education Act of 1965, Public Law 89-10, April 11, 1965.

Elementary and Secondary Education Act Amendments of 1966, Public Law 89-750, November 3, 1966.

Elementary and Secondary Education Amendments of 1967, Public Law 90-247, January 2, 1968.

Faber, J. (1966). The size of a school district. Phi Delta Kappan, 48, 33-35.

Federal Assistance to State Operated and Supported Schools for the Handicapped, Public Law 89-313, November 1, 1965.

Foster, B. J., & Carpenter, J. M. (1978). Statistics of public elementary and secondary day schools, 1977-78 school year. Washington, DC: National Center for Education Statistics, U.S. Department of Health, Education and Welfare.

Gallagher, J. (1972). The special education contract for mildly handicapped children. Exceptional Children, 38, 527-535.

Goldstein, H. (1962). The educable mentally retarded child in the elementary school: What research says to the teacher. Washington, DC: National Education Association.

Greider, C., Pierce, T. M., & Jordan, K. F. (1969). Public school administration. New York: The Ronald Press Co.

Hinkle, D. E., Weirsma, W., & Jurs, S. G. (1974). Applied statistics for the behavioral sciences. Boston: Houghton Mifflin Company.

Howe, C. E. (1981). Administration of special education. Denver: Love Publishing Co.

Huck, S. W., Cormier, W. H., & Bounds, W. G. (1974). Reading statistics and research. New York: Harper & Row.

Kennedy, M. M., & Danielson, L. C. (1978). Where are unserved handicapped children? Education and Training of the Mentally Retarded, 14, 408-413.

Keyes, J. H. (1982). Pupil socoieconomic status, pupil race, and racial composition of the school district as components of the special education placement decision. Unpublished doctoral dissertation, Virginia Tech.

Kidd, J. W. (1970). The organization of special education services. In C. H. Meisgeier & J. D. King (Eds), The process of special education administration. Philadelphia: International Textbook Company.

Knezevich, S. J. (1975). Administration of public education. New York: Harper & Row.

Kohl, J. W., & Marro, T. D. (1971). A normative study of the administrative position in special education (USOE) Project No. 482266, Grant No. (OEG) 0-70-2467(607). University

Park, PA: Center for Cooperative Research with Schools, Pennsylvania State University.

MacMillan, D. L., Jones, R. L., & Aloia, G. F. (1974). The mentally retarded label: A theoretical analysis and review of research. American Journal of Mental Deficiency 79, 241-261.

Marshman, L. R. (1972). Factors related to size and diversity of special education programs. Unpublished doctoral dissertation, University of Texas at Austin.

Matuszek, P., & Oakland, T. (1979). Factors influencing teachers' and psychologists' recommendations regarding special class placement. Journal of School Psychology, 17, 116-125.

Mercer, J. R. (1973). Labeling the mentally retarded. Berkeley: University of California Press.

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

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

Morphet, E. L., Johns, R. L., & Reller, T. L. (1959). Educational administration. Englewood Cliffs, NJ: Prentice-Hall, Inc.

Norusis, M. J. (1985). Advanced statistics guide spssx. New York: McGraw-Hill Book Company.

Patrick, J. L., & Reschly, O. J. (1982). Relationship of state educational criteria and demographic variables to

school-system prevalence of mental retardation. American Journal of Mental Deficiency, 86, 351-360.

Pennsylvania Association for Retarded Children v. Commonwealth of Pennsylvania. 343 F. Supp. 279 (1972).

Public Law 94-142, Rules and Regulations, Federal Register, August 23, 1977.

Rottman, R. L. (1965). Selected factors related to the enrollment of exceptional children in programs of special education. Unpublished doctoral dissertation, University of California.

Rubin, R. A., Krus, P., & Balow, B. (1973). Factors in special class placement. Exceptional Children, 39, 525-532.

Sufrin, S. C. (1962). Issues in federal aid to education. New York: Syracuse University Press.

Turnbull, H. R., & Turnbull, A. P. (1978). Free appropriate public education: Law and implementation. Denver: Love Publishing Co.

U.S. Congress, Senate, Education for all handicapped children act S.6, 94th Congress, 1st Session, June 2, 1975, Report No. 94-168.

Valentine, V. W. (1980). Relationship of planned district expenditures of public law 94-142 appropriations to selected demographic characteristics of school districts in Florida. Ann Arbor, MI: University Microfilms International.

Virginia Education Association (1982). ABC's of school finance. Richmond, VA: VEA.

Voelker, P. H., & Mullen, F. A. (1970). Organization, administration, and supervision of special education. In C. H. Meisgeier, & J. D. King (Eds.) The process of special education administration. Scranton, PA: International Textbook Company.

Weintraub, F. J. (1971). Special Education and the government. In The Encyclopedia of Education. (Vol. 8). New York: Macmillan Co. and Free Press.

Weintraub, F. J., Abeson, A. R., & Braddock, D. L. (1971). State law and education of handicapped children: Issues and recommendations. Arlington, VA: The Council for Exceptional Children.

Weintraub, F. J., & Ballard, J. (1982) Introduction: Bridging the decades. In J. Ballard, B. A. Ramirez, & F. J. Weintraub (Eds.), Special education in America: Its Legal and Governmental Foundations. Reston, VA: The Council for Exceptional Children 1-9.

Zettel, J. J., & Ballard, J. (1982). The education for all handicapped children act of 1975 (P. L. 94-112): Its history, origins, and concepts. In J. Ballard, B. A. Ramirez, & F. J. Weintraub (Eds.), Special education in America: Its legal and governmental foundations Reston, VA: The Council for Exceptional Children, 11-22.

Zettel, J. J., & Weintraub, F. J. (1978). P.L. 94-142: Its origins and implications. The National Elementary Principal, 58(1), 10-13.

APPENDIX A

CHALFANT'S 31 INDICATOR VARIABLES

1. Total Equalized Assessed Valuation per county
2. Valuation per Child in Average Daily Attendance
3. Median Family Income
4. Family Income $3,000 or less
5. Family Income $10,000 or more
6. Total Population
7. Population per Square Mile
8. Civilian Migration
9. Urban Residence %
10. Rural Farm Residence %
11. Non-White Population
12. Median School Years Completed
13. Completed Less Than Five Years School
14. Completed High School or more
15. Public School Average Daily Attendance K-12
16. Private School Enrollment (1-12)
17. Change in Public School Average Daily Attendance % (1951-1961)
18. School Age Children per Square Mile
19. Ratio of Largest School District to Total County Average Daily Attendance
20. Average Daily Attendance of the Largest District in County
21. Employed in Agriculture %
22. Employed in Construction %

23. Employed in Transportation, Communication, Public Utilities %

24. Employed in Wholesale and Retail Trade %

25. Employed White Collar Occupations %

26. Employed Outside County %

27. Employed in Public Administration %

28. Employed in Education %

29. Employed in Finance, Insurance and Real Estate %

30. Employed in Manufacturing %

31. Unemployed %

APPENDIX B

Expectancy Index Scores Per School Division

School Division	Learning Disabled	Mentally Retarded	Emotionally Disturbed	Speech Imparied	% Handicapped
Accomack	3.29	2.40	.31	3.66	10.18
Albemarle	5.17	1.56	.80	3.24	11.59
Amelia	4.15	2.53	.65	3.39	11.56
Amherst	4.16	2.53	.77	3.14	10.70
Appomattox	4.22	1.92	.55	3.50	10.80
Arlington	7.87	1.08	1.11	2.16	13.46
Augusta	5.25	1.52	.56	3.69	11.79
Bath	3.89	1.83	.21	3.77	10.41
Bedford	4.97	1.60	.57	3.66	11.48
Bland	5.03	1.90	.50	3.68	11.82
Botetourt	5.63	1.50	.68	3.67	12.29
Brunswick	3.12	2.94	.53	3.43	10.66
Buchanan	3.82	2.29	.28	3.26	10.48
Buckingham	3.50	2.72	.48	3.48	10.84
Campbell	4.65	1.59	.73	3.44	11.14
Caroline	3.26	2.24	.47	3.48	9.93
Carroll	4.05	2.33	.25	3.59	10.92
Charles City	3.41	2.50	.84	3.21	10.57
Chesterfield	4.51	.94	.92	2.95	10.24
Clarke	5.55	1.62	.69	3.67	12.43
Craig	5.01	1.62	.43	3.83	11.51
Culpeper	4.53	1.76	.67	3.43	11.11
Cumberland	3.46	2.74	.50	3.44	10.80
Dickenson	2.77	2.30	.01	3.40	8.95
Dinwiddie	3.19	2.33	.64	3.12	9.89
Essex	4.46	2.36	.69	3.51	11.89
Fairfax	5.78	.33	.66	1.76	9.25
Fauquier	5.48	1.52	.78	3.37	12.04
Floyd	4.22	2.15	.29	3.65	10.98
Fluvanna	4.57	2.03	.58	3.70	11.57
Franklin	4.65	1.91	.56	3.55	11.40
Frederick	5.26	1.39	.54	3.70	11.61
Giles	4.56	1.60	.41	3.73	10.85
Gloucester	4.91	1.68	.72	3.43	11.53

School Division	Learning Disabled	Mentally Retarded	Emotionally Disturbed	Speech Imparied	% Handicapped
Goochland	4.29	1.98	.69	3.37	11.13
Grayson	4.16	2.18	.27	3.67	10.91
Greene	5.25	1.81	.64	3.56	12.06
Greensville	2.40	3.04	.41	3.29	9.66
Halifax	3.25	2.59	.42	3.50	10.36
Hanover	5.41	1.32	.94	3.21	11.80
Henrico	4.48	1.35	.86	2.77	10.38
Henry	4.12	2.15	.62	3.35	11.10
Highland	5.26	1.62	.45	3.88	12.05
Isle of Wight	4.33	2.18	.82	3.25	11.40
King George	5.08	1.64	.75	3.54	11.76
King Queen	3.82	2.52	.57	3.57	11.20
King William	4.73	1.86	.92	3.28	11.60
Lancaster	3.68	1.96	.38	3.72	10.31
Lee	2.90	2.30	.04	3.67	9.23
Loudoun	5.52	1.09	1.04	2.86	11.44
Louisa	3.90	2.43	.40	3.34	10.97
Lunenburg	3.57	2.67	.48	3.49	10.87
Madison	4.70	2.11	.53	3.65	11.78
Mathews	5.16	1.78	.62	3.71	12.12
Mecklenburg	3.81	2.42	.65	3.41	11.00
Middlesex	5.03	2.14	.62	3.78	12.53
Montgomery	4.18	1.66	.55	3.37	10.36
Nelson	3.76	2.41	.37	3.55	10.74
New Kent	5.26	1.68	.83	3.50	12.10
Northampton	2.76	2.61	.32	3.63	9.72
Northumberland	3.08	2.13	.31	3.57	9.52
Nottoway	3.17	2.52	.55	3.24	10.07
Orange	4.91	1.88	.62	3.63	11.81
Page	3.41	2.02	.19	3.51	9.61
Patrick	4.76	2.22	.47	3.59	11.87
Pittsylvania	3.47	2.30	.47	3.45	10.39
Powhatan	5.07	1.59	.81	3.46	11.66
Prince Edward	3.44	2.37	.58	3.34	10.37
Prince George	3.98	1.70	.77	3.26	10.24

School Division	Learning Disabled	Mentally Retarded	Emotionally Disturbed	Speech Imparied	% Handicapped
Prince William	4.55	.80	.94	2.90	10.12
Pulaski	4.17	1.78	.46	3.49	10.54
Rappahannock	4.56	2.17	.51	3.46	11.41
Richmond	3.97	2.19	.52	3.55	10.87
Roanoke	4.91	1.17	.90	3.07	10.90
Rockbridge	4.38	1.83	.31	3.71	10.85
Rockingham	5.57	1.56	.58	3.70	12.25
Russell	3.88	1.96	.28	3.55	10.26
Scott	3.13	2.33	.13	3.52	9.60
Shenandoah	5.31	1.69	.51	3.75	12.05
Smyth	3.69	2.04	.28	3.53	10.12
Southampton	3.67	2.65	.62	3.35	11.07
Spotsylvania	5.00	1.42	.66	3.55	11.33
Stafford	5.07	1.14	.74	3.39	11.04
Surry	3.09	2.79	.52	3.35	10.69
Sussex	3.03	3.08	.60	3.22	10.71
Tazewell	3.82	1.68	.41	3.47	9.97
Warren	4.18	1.56	.57	3.35	10.23
Washington	4.34	1.82	.34	3.71	10.84
Westmoreland	3.37	2.26	.43	3.54	10.07
Wise	3.68	1.87	.33	3.45	9.95
Wythe	4.41	1.90	.48	3.53	10.99
York	4.31	1.33	.93	2.91	10.15
Alleghany Highland	4.31	1.77	.61	3.50	10.73
Alexandria	7.67	1.17	1.15	2.37	13.79
Bristol	4.08	1.66	.65	3.06	10.13
Buena Vista	3.61	1.74	.56	2.85	9.30
Charlottesville	5.44	1.85	.88	2.93	12.33
Colonial Heights	5.50	1.16	1.07	2.75	11.46
Covington	3.78	1.93	.65	2.88	10.00
Danville	3.66	2.12	.73	2.83	10.18
Falls Church	7.81	.33	1.34	2.94	13.94
Fredericksburg	4.37	1.77	.77	2.96	10.82
Galax	3.58	2.24	.59	2.94	10.18
Hampton	3.31	1.61	.73	2.96	9.40

School Division	Learning Disabled	Mentally Retarded	Emotionally Disturbed	Speech Imparied	% Handicapped
Harrisonburg	5.57	1.69	.84	3.02	12.30
Hopewell	4.25	1.65	.85	2.85	10.35
Lynchburg	4.21	1.80	.88	2.00	10.66
Martinsville	4.20	1.97	.95	2.88	10.85
Newport News	3.51	1.68	.72	2.98	9.72
Norfolk	3.65	1.78	.47	3.28	10.32
Norton	3.71	1.91	.67	2.95	9.90
Petersburg	2.76	2.31	.87	2.81	9.39
Portsmouth	3.42	1.96	.73	2.96	9.91
Radford	4.18	1.61	.71	2.97	10.12
Richmond City	3.67	2.16	.68	2.74	10.23
Roanoke City	4.15	1.84	.72	3.04	10.65
Staunton	5.01	1.61	.90	2.90	11.40
Suffolk	2.78	2.28	.79	2.88	9.30
Virginia Beach	3.69	1.09	.60	2.91	9.12
Waynesboro	4.70	1.56	.85	2.91	10.87
Williamsburg	5.82	1.28	.99	3.23	12.51
Winchester	4.48	1.67	.72	3.01	10.76
South Boston	3.21	2.25	.82	2.76	9.71
Franklin City	2.51	2.46	.80	2.66	8.97
Chesapeake	3.44	1.50	.85	2.92	9.40
Lexington	4.67	1.83	.70	3.04	11.15
Salem	4.89	1.52	.87	2.95	11.15
Poquoson	4.87	.98	1.14	2.61	10.28
Mansassas City	5.39	1.02	1.21	2.56	11.20
Manassas Park	5.77	1.25	1.09	2.69	11.80

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