

INTELLECTUAL ASPECTS OF REGULAR SCHOOL
INTEGRATION FOR PHYSICALLY DISABLED CHILDREN

by

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ABSTRACT

In recent years there has been a trend towards integration, or mainstreaming, for educating the handicapped child. The aim of this study was to explore some effects of integrating physically disabled children into regular school from a special school and thus obtain data to aid in making further integration decisions.

Specifically in this study two groups of physically disabled children who had attended a special rehabilitation hospital school were compared in intellectual abilities, after one group had integrated into the regular school. It was hypothesized that, as several verbal subtests of the Wechsler Intelligence Scale for Children appear to be influenced by environmental stimuli, those integrated into the regular school will have increased scaled scores over those who remained in the special school. To discuss results within a broader framework it was also hypothesized that gains would be correlated with higher motivation levels, a lesser degree of severity of disability, and better social adjustment.

An analysis of covariance indicated a significant improvement in verbal intelligence by the experimental group in comparison to the control group, with the most gains being made by the youngest age group (6-8 years). Results showed that not only did those in the experimental group improve

but that those who stayed in the special school declined in comparison to their own previous scores. This decline was particularly evident for those children with the highest verbal intelligence scores in the control group, which were in the average range for the test normative sample.

Pearson correlation coefficients indicated that gains in verbal intelligence did not appear to be related to either school or non-school interest level, the severity of the disability, sex or social adjustment.

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CHAPTER 1

INTRODUCTION

Background to the Problem

The trend of the educational history of the handicapped is one of progressive inclusion (Turnbull and Schulz,, 1979). In ancient times there was no education for the handicapped, but beginning in the 18th century residential and day schools were developed for both education and training. In the 1900's, there were many residential and special schools for the blind, deaf and the physically handicapped but special classes in regular schools were preferred for only the mildly, cognitively impaired.

Gradually, there was increased acceptance of the needs and benefits of education for the handicapped. This, together with the belief of the educability of handicapped individuals and the development of assessment tools for the measurement of intelligence and expected potential, led to the emergence in the 1960's of administrative models for the planning of special education. These models show a continuum of educational services. They are based on the belief that the wide diversity of handicaps, together with the varying degrees of severity, demand many different combinations of assistance. The most commonly cited organizational schemes are the Cascade Models of Reynolds (1962), Deno (1970) and the Instructional Cascade Model by Reynolds and Birch (1977) (see Appendix A).

The Reynolds and Birch model (1977), suggests that regular classes become expandingly diverse, thus reducing the dependence on separate specialized environments. This model reflects the philosophy of mainstreaming, that is the education of children in the least restrictive environment which for many children is the regular class. Along with this philosophy has been the development of special classes, or a combination of regular and special classes, for many of those previously in an institution or receiving no educational programme.

According to the National Advisory Council on Education Professions Development (1976),

"... mainstreaming is the conscientious effort to place handicapped children into the least restrictive educational setting which is appropriate to their needs. The primary objective of this process is to provide children with the most effective educational experiences which will enable them to become self-reliant adults. Within this objective, it is thought preferable to educate children the least distance away from the mainstream of society. Hence there is a heavy emphasis on movement into the regular classroom whenever possible."
(p. 7.)

Statistics however, revealed a great discrepancy between this intention and its implementation. In the 1975 congressional preamble to the U.S. Public Law 94-142 it was estimated that of the eight million handicapped children in the United States, four million did not have appropriate educational opportunities and one million were entirely excluded from

the public school system (United States Office of Education, 1975). To try to remedy this situation, Public Law 94-142 was passed in the United States. This is known as the "Education for All Handicapped Children Act of 1975". It stipulated that all handicapped children must have access to a free and appropriate public education, in the least restrictive environment with special education and related services available when needed. The passing of this bill has had far reaching effects on catapulting the philosophy of mainstreaming (or integration) into reality.

Statement of the Problem

The main problem of this study was to determine the benefits and appropriateness of the integrated school placement which is suggested by the mainstreaming philosophy. Specifically, this study was concerned with a population of physically handicapped children who had been integrated into a regular school from a special hospital school for the physically disabled. The purpose was to assess whether knowledge and abilities related to environmental influences had improved since this exposure to the mainstream of society. The tool used to assess these changes was an intelligence scale. In Chapter II a discussion regarding environmental influences on intelligence and a rationale for the use of particular subtests of the scale is given.

To assess results within a wider context, an interest scale, school adjustment factors, and the level of severity of disability are also discussed within the framework of this research.

Significance of the Problem

The transfer from the sheltered environment of the institution or hospital setting into the fast-moving mainstream of normal children and adolescents is often a dramatic one, involving many physical, social, emotional and educational adaptations. These aspects of the transfer have to be weighed against the limitations of the segregated, special school. These stem particularly from the dependence on a social organization geared to meet the child's needs. Dibner and Dibner (1973) note with regard to the physically disabled in the sheltered special school,

"He may lose motivation to be a productive individual because the special grouping prevents few problems, hurdles or challenges which require his stretching to adjust. It is adjusted to him. (p. 181).

The impetus for this study came from frequent observations of the controversy over this transfer and from the need for objective analysis of the benefits of placement in a regular school.

A search of the literature revealed that very little has been documented with reference to mainstreaming the phy-

sically handicapped. Areas mentioned include, for example, guidebooks for classroom teachers (Turnbull and Shulz, 1979, Dahl, Appleby and Lipe, 1978 and Love and Walthall 1977); attitudinal changes of both teachers and students (Pell, 1972; Rapier, J., Adelson, R., Carey, R. and Croke, K., 1972, Walker, 1974 and Anderson, 1973) and social integration (Friedman, 1975; Jones, 1974, and Anderson, 1973). There is little evidence, however, regarding one of the main premises of the philosophy of mainstreaming - that educationally these children are comparatively benefitting from their integration into regular school.

Allen (1980) also found this lack of research stating,

"The mainstreaming movement has grown enormously over the past several years, despite a lack of well researched guidelines for implementing the concept or well researched methods for evaluating its effectiveness. Existing research, sparse, fragmented, and inconsistent, is primarily descriptive or anecdotal rather than empirical and data-based."
(p. 54.)

Further, Ackerman and Moore (1976) note that mainstreaming is operating under the assumed-value argument that is often typical of change in educational practice.

It is the purpose of this study to provide empirical data for a specific group, namely the physically or motor disabled, with respect to some intellectual effects of integrating into regular school.

Operational Definitions

The Physically Handicapped

The term physically handicapped covers a wide range of conditions which may be due to congenital abnormalities or acquired through accident, infection or disease. A child with a physical impairment is not necessarily a handicapped child; the critical determiner is the adjustment factor. A child is handicapped only when his physical impairment interferes with his daily functioning.

The physically handicapped include, for example, those with physically weakening conditions such as asthma, causing low vitality; the chronic illnesses, such as heart disorders, diabetes and haemophilia; and the orthopaedic disabilities where the muscles, bones and joints are impaired, such as is caused by poliomyelitis, Perthes disease and muscular dystrophy. One of these serious crippling conditions, cerebral palsy, is the most common (Gearheart, 1976), with an estimated 1-5 cerebral palsy births per 1,000 of population (Cruikshank, 1976) or about 15% of the child population. About 57% of those with cerebral palsy are males. Although cerebral palsy can be acquired as a result of a head injury or an infectious disease, it is most often present at birth. It is characterized by the disturbance of voluntary movements because of brain injury. Motor deficits vary widely includ-

ing, hemi-, diplegia, quadraplegia or paraplegia with spasticity, athetosis, ataxia, rigidity or mixed forms. Since there may be varying degrees of brain injury, many of these children will have multiple handicapping conditions, such as hearing impairments, visual and speech problems. They may also have learning disorders, behaviour problems and/or intellectual deficits.

Developmental delays are common. Many theorists have commented on the relationship of learning and motor developments; for example, Piaget's (1968) developmental approach to concept formation, Kephart's (1960) concept of motor learning as a base for development and Cratly's (1969) concept of movement as an adjunct to learning. Thus the physically handicapped child may be further disadvantaged in development, growth, and learning developmentally normal interaction with peers.

In this study, the sample children all had orthopaedic handicaps and a high proportion had been diagnosed with cerebral palsy. Manifestations vary widely but all had some form of muscle weakness in gross or fine motor skills which inhibited daily functioning. Most used physical aids, such as braces or wheelchairs, to facilitate mobility.

Organization of the Thesis

This first chapter is introductory and includes a general background of the problem, a statement of the problem, the

significance of the problem, and operational definitions. The remainder of the thesis is organized as follows. Chapter II consists of a review of the literature, rationale for the hypotheses, and a statement of the hypotheses. In Chapter III information regarding the subjects and instrumentation is presented. A description of the design and procedures used in conducting the study and analysing the results is also provided. Chapter IV presents the results. The fifth chapter summarizes the findings of the study and sets forth conclusions and the implications for further research.

CHAPTER II

PREVIOUS RELATED RESEARCH

This chapter is concerned with related research. Firstly, the success of mainstreaming is presented within the context of three areas; vocational success, levels of self concept and academic achievement. Secondly, the influences of the environment on intellectual ability are discussed and an argument for the use of a specific intelligence test, the WISC-R is rationalized. Thirdly, information regarding school adjustment considerations is given with reference to motivation, severity of disability and social adjustment. Finally two hypotheses are stated.

Success of Mainstreaming

A review of research shows that although there is general agreement that the adjustment of the physically handicapped person to the 'normal' world is likely to be easier if he has had frequent interaction with it in earlier life, there is a paucity of research to support this assumption. There are, however, a few studies in the areas of vocational success, self-concept and academic achievement.

Vocational Success

One related area, that has been researched, is the ability to lead an independent life. This is measured as the degree

of success in finding and keeping a job. Studies include Ingram's (1965) with young adults with cerebral palsy, Robertson's (1963) with the mentally retarded and Cutsforth's (1962) with the blind. All the studies compare the vocational success of young adults who had been in regular school placements with those in a special school or class. They generally decide that a child who has attended an ordinary class has a better or equal chance of occupational success. Robertson, for example, attempted to ascertain the occupational success in students who had been ascertained subnormal. 303 students had attended special schools and 167 of the controls had been assessed as needing a special school but had attended a regular secondary modern school. Special school attendance failed to indicate an advantage in occupational success. However, the design was weakened by the inability to trace many of the school leavers.

Self-Concept

Another way to investigate the effects of schooling is to assess self-concept; how a person feels about himself and his handicap. Evidence, however, in this area is contradictory. On the one hand there is evidence that the separation of handicapped from non-handicapped children leads to feelings of inferiority (Jones 1974, Meyerowitz 1965, 1967). Carrol (1967) found, with educable mentally retarded, that children who had remained part-time in regular classes showed

a significant decrease in the extent to which they devalued themselves compared to those who were segregated who showed a significant increase on the self-derogation scale. Budoff and Gottlieb's work (1976) indicates an improved self-image among the mainstreamed retarded who have been integrated into regular classes. On the other hand, Walker (1974) found no significant difference regarding self-concept when using the Bristol Social Adjustment Guides when a group assigned to a regular class (receiving resource room instruction when needed) was compared to a group in a self-contained special class.

Some researchers argue that regular class placement provides models in comparison with which the physically handicapped child feels inferior. Thus, this setting may impose more social and emotional strains on the children than would the sheltered setting. Jones (1974 b) notes that special class students reported more positive evaluations of their schools than regular class students. Also Easton (1979) related, in her study with physically handicapped children, that the children in a special school saw themselves as functioning better with peers than did the group of children attending school with normal children.

Another view is presented by Strang, Smith and Rogers (1978) who found that academically handicapped children, integrated into the educational mainstream for part of

each school day, exhibited significantly augmented self-concepts relative to other academically handicapped children who remained in segregated special classrooms. Secondly, they found that these partially mainstreamed children exhibited significantly increased self-concept while fully mainstreamed children exhibited significantly decreased self-concept. They state that this occurred possibly as a result of the partially mainstreamed children's ability to compare the different reference groups. They concluded that the two experiments provided striking confirmation of the hypothesis derived from social comparison theory and group reference theory.

Myers (1976) found that those with higher I.Q. (71-85) appeared to have an equally positive self-concept in any of the three administrative settings of special school, special class or regular class. Lower I.Q. (49-70) pupils, however, appeared to have a more positive self-concept in the special school than in either the regular or special class.

Academic Skills

Carrol (1967) compared the effects of two school programmes (segregated and partially integrated) with educationally mentally retarded (EMR) children. She found that

the EMR partially integrated group made significantly greater growth in the area of reading, but no significant difference between EMR groups was found in the areas of spelling and arithmetic.

Walker (1974) found that children in regular classes with resource room programmes were significantly better in all academic areas at each of two testings 8 months apart. However, over a two year period, there were no significant differences between the gains in self-concept, social adjustment, and arithmetic. The regular classroom children obtained significantly higher gains in word reading and vocabulary than the special class children over this 2 year period. They conclude that the academic and social-emotional needs of the mentally retarded child can be met as well, if not better, in the regular class with resource room programmes, as in the special class.

Myers (1976) used two groups of high and low I.Q. (71-85 and 49-70 respectively). Three placement settings were utilized - special school, special class, and regular class, which he found to have differential effects on high and low I.Q. The special school appeared to be a preferential educational setting for the low I.Q. group for academic achievement while no substantial differences seemed to exist for the high I.Q. group in terms of educational placement.

Easton (1979) studied a group of physically handicapped children over three years after they were transferred from an isolated special school to a setting integrated with normal children. She found that scores on the PIAT increased 'substantially' for those integrated with normal children, but does not give specific statistical evidence.

Jones (1974) hypothesized that as the degree of physical dependency decreased and as mobility increases, the orthopaedically disabled child becomes more internally controlled and better adjusted to his or her relationships with significant others (e.g. teachers and peers) and achieves higher levels. The converse is that with increased physical dependency and with decreased mobility the child becomes externally centered in his relationship to his environment, has impaired relationships with significant others, and achieves at a lower level. The findings however showed no support for the hypotheses that suggested that impaired mobility and physical dependency influence orthopaedically disabled children's school achievement or teacher rated interpersonal relationships.

In conclusion, the measurement of the effects of regular class placement by either vocational success, more positive self-concept or academic achievement appear inconclusive and dependent on a wide range of variables. In this study, an alternative concept for assessing the benefits of

the regular school setting for the physically handicapped was used. In the next section a multi-dimensional approach, which compares the results of the subtest scores of an intelligence scale, is rationalized with regard to the integration model.

Intelligence and the Environment

An intelligence test is one way to evaluate an individual's unique abilities on a multi-dimensional level.

Wechsler (1958), for example, defined intelligence as -

" . . . the aggregate or global capacity of the individual to act purposefully, to think rationally and to deal effectively with his environment." (p. 7.)

Although there has been considerable theorizing between the nature-nurture bases of intelligence there appears to have been a coalescing of viewpoints with stress being placed on both developmental as well as innate influences on intelligence. Sattler (1974), for example, writes -

"Intelligence is viewed as being a central 'fluid' kind of genetically determined basic ability which is modified by experience." (p. 15.)

Tyler (1971) also observes that an I.Q. is not a pure measure of innate capacity -

" . . . rather it reflects experience as well as potential, education as well as aptitude." (p. 48.)

Vernon (1969) describes three different meanings associated with the term 'intelligence'. Intelligence A is used with regard to innate ability, or genotypic form. It can never be measured directly. Intelligence B is an individual's observed behaviour or phenotypic form. It is built up through the individual's reaction with his environment. Vernon's third meaning of intelligence, Intelligence C, is affected by extrinsic factors and is sampled by the results obtained on specialized tests, for example, mechanical. It is the environmentally influenced Intelligence B which is pertinent in this study. The tests Vernon suggests for sampling Intelligence B are the Stanford Binet Intelligence Scale and the verbal scale of the Wechsler Intelligence Scale for Children. It will be shown that specific subtests of the WISC are the most appropriate tools for this study.

The Wechsler Intelligence Scale for Children (WISC or WISC-R)

The WISC rather than the Stanford Binet was chosen for this study because of the preferential format. Whereas the Stanford Binet has an age scale system, the WISC is based on a point scale system which measures the same aspects of behaviour at every age. This comparability factor of the Wechsler Scale makes it an ideal test for this study. The

WISC originally developed in 1949 was revised in 1974. This revised edition, known as the WISC-R, is the test used throughout this study. However, the WISC and WISC-R are basically similar (changes are discussed in Chapter IV) and thus studies regarding both the WISC and WISC-R are discussed.

In reviewing analyses of the subtests of the WISC and WISC-R it has been suggested that some subtests are more influenced by environmental stimuli than others. Whether looking at factor analytic findings, for example, Cohen (1959) and Kaufman (1975), an ego psychological approach such as Rapaport, Gill and Schafer (1968) or the clinical interpretations by Glasser and Zimmerman (1967) similarities appear regarding subtest functions and influencing factors. It appears that primarily four subtests are influenced by contact with the environment. These are the information, comprehension, similarities and vocabulary subtests of the verbal scale as Sattler (1974) shows in Table 1. . . .

Kaufman (1975) completed a factor analytic study of the WISC-R. He found five factors similar to those obtained by Cohen (1959) with the WISC. Verbal Comprehension 1 is presumed to reflect knowledge from formal education. The Perceptual Organization factor is non-verbal and reflects ability to interpret and organize visual material. The Freedom from Distractibility factor may measure the ability to concentrate. The Verbal Comprehension Factor 11 represents the application

of verbal skills in situations that are new, or judgement in verbal situations. The last factor, the Quasi-Specific, has no psychological interpretation. He further defined three distinct factors; the Verbal Comprehension factor being comprised of primary factors 1 and 11 and being representative of environmental influences on a verbal dimension. The subtests with the highest loadings in the Verbal Comprehension factor score are Information, Comprehension, Similarities and Vocabulary, followed by arithmetic which has a moderate loading.

Table 1

Suggested Functions and Influencing Factors of the WISC-R

<u>Subtest</u>	<u>Function</u>	<u>Influencing Factors</u>
Information	Range of knowledge Long-range memory	Natural endowment Richness of early environment Extent of schooling Cultural predilections Interests
Comprehension	Social judgement, social conventionality, or common sense Meaningful and emotionally relevant use of facts	Extensiveness of cultural opportunities Development of conscience or moral sense Ability to evaluate and use past experience
Similarities	Verbal concept formation Logical thinking	A minimum of cultural opportunities, interests and reading patterns
Vocabulary	Learning ability Fund of information Richness of ideas Memory Concept formation Language development	Early educational environment

The Performance Scale subtest loadings were all lower than those on the Verbal Scale. Interestingly two performance tests showed greater loadings on this factor than the rest of the performance subtests. These were Picture Completion, which involves verbal responses for most children, and Picture arrangement which Kaufman (1975) suggests requires more verbal mediation than other performance subtests.

Table 2

Verbal Comprehension (Factor A) Loadings of WISC-R Subtests Showing Median Scores for Eleven Age Groups (Varimax Rotation)

<u>Subtest</u>	<u>mdn</u>
Information	63
Similarities	64
Arithmetic	37
Vocabulary	72
Comprehension	64
Picture Completion	35
Picture Arrangement	33
Block Design	27
Object Assembly	21
Coding	15

Practical Application

Most researchers state consistent, moderate but dependable relationships between intelligence and achievement scores (Vernon 1970, Sattler 1974). Resnick (1976), for example, states that intelligence tests measure primarily academic intelligence. Wesman (1968) also states that tests with different names (e.g. intelligence, achievement, or

aptitude) are for the most part measuring similar abilities. These are a) that intelligence is an attribute, and b) that it is a summation of the learning experiences of the individual. Humphreys (1962) found that scores on I.Q. and achievement tests correlated as highly as scores on two different I.Q. tests (WISC and Stanford Binet). The correlation between achievement and intelligence has also been assessed by Bloom (1964) who reported an average correlation of .85 whilst Tyler (1974) found correlations varying from .40 to .60. Limitations mentioned were restrictions of range, language predictions and the suitability of tests for different age groups.

Academic achievement is one of the primary objectives of educational experiences. The advantage of using the Weschler Intelligence Scale for Children in this study is the practical implication regarding academic achievement.

School Adjustment Considerations

Although the chosen focus of this study was on intellectual changes related to mainstreaming it would be an error to view this area in total isolation. As Anderson (1973) stated with reference to the integration of cerebral palsied children -

"'Education' has to be understood here in its very widest sense as including three major aspects of the child's development, firstly his educational needs, secondly his physical needs and thirdly his social and emotional needs." (p. 15)

Thus, in this study, data was gathered to assess results within a wider context. From the wide realm of factors related to the adjustment of the physically disabled child into the regular school. Three major areas were chosen for discussion. These were firstly, interest in school and social activities, or motivation; secondly, the extent of the physical disability and thirdly, social adjustment on a broad spectrum.

Motivation

Although many opinions have been documented analyzing motivation and how it energizes human behaviour (Madsen, 1974 and Weiner, 1974), generally educational motivation is described within the framework of the following statement by Kolesnik -

"From the standpoint of humanistic psychology, classroom motivation is largely a process of helping the student to perceive that certain learning experiences can help him to become what he is capable of becoming and what he wants to become: a fully functioning, happy, self actualizing person." (P. 170-171)

Motivation therefore is very pertinent to the philosophy and success of mainstreaming. Motivation was sampled by using the Woodcock-Johnson Psycho-Education Battery Interest subtests. This scale tests preferences in Reading, Mathematics and Written Language on the scholastic scale and physical and social interests on the non-scholastic scale; thus providing information on motivation across a broad spectrum.

Severity of Disability

As one of the main criteria for placement in a regular school is the extent of the physical handicap, this area was chosen as particularly pertinent to this study. Anderson (1973) wrote -

"Clearly severity of handicap is a potentially important factor in determining the success or failure of a child in various aspects of school life, and indeed in determining whether that child is placed in an ordinary school at all." (p. 32)

School life involves constant utilizing of both gross and fine motor skills. Although the facilities and accommodation of the school are an important consideration there are certain fundamental activities that will be inhibited. These include, many sports activities on the gross motor side to fine-motor dexterity in the classroom, affecting speed in performance.

The Pulbetic assessment system was chosen that rates both fine and gross motor skills on the left and right sides individually, to obtain a mild, moderate or severe categorization. It was administered with the modifications based on Anderson's (1973) research.

Social Adjustment

Wilson (1973) writes -

"One of the important factors that influence an individual's ability to achieve in academic areas and to develop his intellectual potential is the degree to which he is able to acquire and maintain a state of personal and social adjustment. (p. 477).

Social adaptation, or adjustment, was defined by Doll (1953) as -

'the functional ability of the human organism for exercising personal independence and social responsibility.' (p. 4)

Lunzer (1966) expanded this idea to emphasize that social competence is not a resulting factor of only innate cognitive abilities and personality but also the effects on him of different environmental experiences.

However, Richardson (1969) pointed out that many physically handicapped children have, by the very nature of their disability, missed experiences common to non-handicapped children. Anderson (1973) commented further that the extent to which the social environment is impoverished is likely to be related to the severity of the physical handicap and to the resulting restrictions on activities.

An evaluation by the classroom teacher of various aspects of adjustment was considered particularly significant for this study. The areas chosen are those of the Hurewitz Quick Scoring Behaviour Rating Scale and include social and work habits, relationships with parents and other adults, emotional responses, general physical appearance and health, and use of crafts and creative media.

HYPOTHESES

Previously an explanation of integration was given which hypothesized benefits obtained from the environment and states that children will become the most self-reliant adults if they are educated the least distance away from the mainstream of society. In this study an expanded environment has been discussed within the framework of attending a regular school versus the restricted setting of a segregated special school for the physically disabled, in a hospital setting. Also a rationale for using an Intelligence Scale was discussed with suggestions that certain subtests are more environmentally influenced than others. Following this rationale it is hypothesized that -

1. If the philosophy of integration is viable, then knowledge and abilities related to increased environmental influences should improve after regular school placement. Specifically, WISC-R results obtained from physically handicapped children in regular school should be improved significantly over results obtained from the same children when tested in a special school, and over children who have stayed in the special school.

Secondly some factors related to school adjustment were discussed. It was suggested that there are many other variables related to maximizing the opportunities of the regular class environment. Three were chosen for discussion; motivation, severity of handicap, and social adjustment. It is hypothesized that -

2. The WISC-R scores of the groups of children who have integrated into regular school compared to the scores of those who have remained in the special school will improve in relation to:
 - a. a higher level of motivation.
 - b. less severity of disability.
 - c. positive social adjustment to the regular school.

CHAPTER III

METHOD

This section includes a description of the subjects and the procedures employed in the present study. Next, a description of the instruments used and the possible limitations of the design are also discussed. The procedure that was used is detailed for replication and finally, methods by which the data were analyzed are also included.

Subjects

Subjects for this study were children who had all attended the G.F. Strong Rehabilitation Centre School for the physically disabled. This is the central educational-therapeutic setting for the physically disabled in British Columbia and hereafter will be referred to as the special school.

Definition of Groups

Two administrative groups were identified. a) The experimental group consisted of students who had attended the G.F. Strong School and have since entered regular school. Placement may be in a regular classroom, a special class, some learning assistance centre placement, or a combination of setting. b) The control group consisted of students

who have remained attending the G.F. Strong Rehabilitation School.

Selection of Subjects

The subjects used were all those for whom results of previous testing on the WISC-R was available and included children who had been integrated between 1976 and 1980. Students were not included who had pre-test verbal scores below an I.Q. of 55.

In the final analysis, 12 of those who were integrated and 16 of those children who remained in the G.F. Strong school could be used in the study.

Physical Disabilities

All the subjects had motor handicaps which interfere with daily functioning. There were several types of disabilities, (see Table 3), although 68% had cerebral palsy. This percentage is close to the figure of 65% of the motor disabled children in the Swedish school system being diagnosed with cerebral palsy (Anderson 1973).

Table 3Types of Disabilities by Group

Disabilities	Experimental n = 12	Control n = 16
Diplegia	2	2
Quadriplegia	4	9
Paraplegia Cerebral palsy		
Hemiplegia		1
Triplegia		1
Pseudo Hypertrophic		
Muscular Dystrophy		1
Spinal Muscular Atrophy		1
Arthrogryposis	1	
Freidreich's Ataxia	2	
Trauma (Motor Vehicle Accident)	1	
Spina Bifida	1	
Smith-Lemli Opitz Syndrome	1	
Meningioma Posterior Fossa		1

When measured by the Pulbetic system (see Chapter IV) t-Test analysis showed that there was not a significant difference in the level of the severity of disability between the two groups (Table 4).

Table 4

Grade of Severity of Physical Disability
by t-Test Analysis

	n	M	SD	<u>t</u>
Control	16	1.31	0.48	-1.66
Experimental	12	1.67	0.65	

Pre-Test Verbal I.Q. of Groups

Calculation of the means of the two groups showed that the experimental group was slightly higher in Verbal I.Q. although this was not a significant difference. The range and standard deviation were larger in the control group.

Table 5

Verbal I.Q., Mean, Standard Deviation,
Minimum and Maximum Scores

	n	M	SD	Scores	
				Min.	Max.
Experimental	12	81.67	12.4	59	101
Control	16	78.56	18.69	55	107

As would be expected with a group with a high percentage of cerebral palsy (Cruikshank, Hallahan and Bice (1976), the mean I.Q. was lower than is average for the general population.

A comparison between the distribution of I.Q. scores for normal and cerebral palsied children is shown in Figure I to put these in perspective.

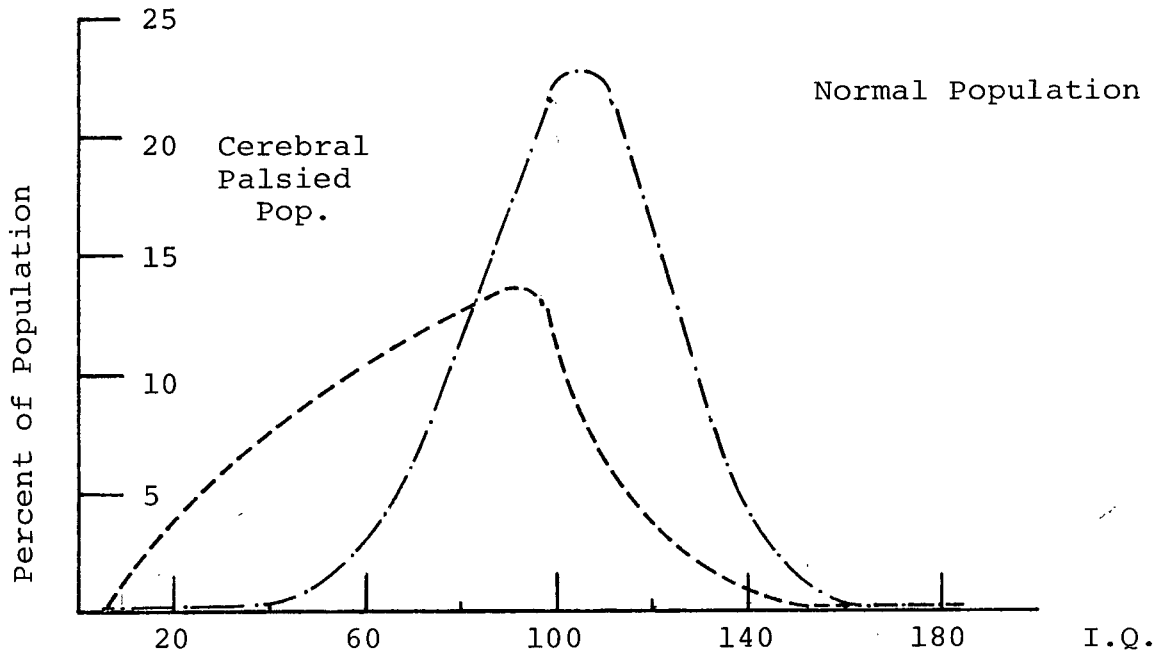


Figure I

Hypothetical curves showing distribution of test I.Q. scores for normal and cerebral palsied populations from Hopkins, Bice and Colton, (1954)

Age and Sex of Subjects

As the total number of subjects was small, they were grouped by chronological age. Age categories chosen were 1) 6-8 years, 2) 9-11 years and 3) 12 years and over. Table 6 shows that the age distribution is weighted in favour of younger and older children in the control group and the middle age group in the experimental population, although both groups have a spread in all three groups.

The sex ratio was 7 females and 5 males in the experimental group and 8 of each in the control group.

Table 6Age Groups by Pretest Ages

Group	n	Age		
		6-8 years	9-11 years	12 and over
Experimental	12	3	6	3
Control	16	7	3	6

Instruments

To test Hypothesis 1 the Wechsler Intelligence Scale for Children-Revised was given to all subjects. The whole test was administered in accordance with standardization procedures.

Description and Evaluation of the WISC-R

The WISC is a well known instrument that is widely used. It was revised in 1974 (WISC-R) twenty five years after its original publication. Standardization of the WISC-R is excellent, and includes both white and non-white children.

Reliabilities for the scale scores of the verbal, performance, and full scales of the WISC-R are very high, averaging .94, .90, and .96 respectively. The standard error of measurement for the full scale is about three I.Q. points.

Congruent validity studies indicate findings similar to the WISC; a correlation of .82 for the full scale I.Q. of the WISC-R with the Wechsler Preschool and Primary Scale of Intelligence, (WPPSI), .95 with the Wechsler Adult Intelligence Scale and .73 with the Stanford-Binet. Limitations of the WISC-R relevant to this study are a problem of culturally biased items and the difficulty in scoring some subtests.

To test Hypothesis 2, three measures were chosen; the Woodcock-Johnson Psycho-Educational Battery to assess motivation, the Pultibec System for the medical assessment of handicapped children to measure severity of disability and the Hurewitz Quick-Scoring Behaviour Rating Scale to assess adaptive behaviour.

The Woodcock-Johnson Psycho-Educational Battery

The Woodcock-Johnson interest level subtests were chosen as they provide a broad focus on both scholastic and non-scholastic preferences. This recent test has the further advantage of being standardized for both elementary and high school students.

The scholastic subtests consist of a student's preference in reading, mathematics and written language and the non-scholastic subtests address physical and social interest.

High reliabilities are recorded; for example a median reliability of .88 on reading interest, .86 on mathematics, .88 on written language, .87 on physical interest and .79 on social interest. Most validity studies focus on the cognitive and achievement parts of the test. Only one table related to interest scale appears, showing concurrent validity of .47 between liking school on an opinion questionnaire and scholastic interest scale.

The Pultibec System for the Medical Assessment of Handicapped Children

This system was chosen because it was designed to evaluate the positive functional capacities of the individual besides his overt deficits, thus providing a full assessment for categorization. The Pultibec System also has the advantage of providing a system of comparison, regarding severity of handicap, to be made both between children with the same diagnostic label and between children with quite different disabilities. It also provides a means of comparing not only the overall severity of the handicap but also the distribution of functional impairments within and between individuals; for example, whether hand control is more impaired than mobility.

In the Pultibec System a child's functional capacities are placed under 8 main headings, the code letters of which

form the term 'Pultibec'. These 8 headings embrace 4 physical qualities and 4 qualities of behaviour and communication. Of these, the first four motor qualities are relevant to the study. These are P for physical capacity, U for upper limbs divided into Rt hand and arm, left hand and arm, L for locomotion which includes right lower limb and left lower limb and T for toileting.

As the Pultibec System involves 6 and sometimes 11 suggested rating categories in the motor scales a modified system utilized by Anderson (1973) will be used. (see Appendix B). In her study regarding physically handicapped children the ratings for severity of handicap were compressed to four; that is grade 1 indicated complete normality, grade 2 a 'minor' problem and grades 3 or 4 a 'major' problem. Further Anderson (1973) provides specific criteria for rating a child as mildly, moderately or severely handicapped as follows.

1. Mildly handicapped children are those who have no major problems and not more than 4 minor problems.
2. Moderately handicapped children are those with at least one but not more than three major problems or children with more than four minor problems.
3. Severely handicapped children are those with more than 3 major problems.

Anderson (1973) reports high reliability for this system, but no specific figures were given.

The Hurewitz Quick Scoring Behaviour Rating Scale

The Hurewitz Quick Scoring Behaviour Rating Scale (see Appendix C) is an unpublished test. It was chosen because it is specifically designed to evaluate educational programmes and covers a wide spectrum of appropriate variables for this study. Further it is one of the few scales in this area that can be used for both high school and elementary students.

Variables covered include 1) social habits, 2) relationships with adults, 3) relationships with parents, 4) emotional response, 5) work habits and achievement, 6) general physical appearance and health, 7) use of crafts and creative media.

The scale is used to show if there has been any improvement or change in the child's functioning. The rating scale includes two parts: the first is a qualitative rating, using for example behaviour deteriorating or good improvement. The second part is concerned with the frequency of these responses. A child for example who shows good improvement in an area would receive a rating of 2 (good improvement). If the child shows some good changes, but the changes occur only sometimes, he would be rated 1 (showing fair improvement). If an area of adjustment is generally good and there is no need for improvement, the child should be rated with a 2 (good) or three (excellent).

No specific information is given regarding reliability and validity. It is stated that over one thousand students

and teachers have used these scales. The categories were developed with teachers and other professionals, and they were found to be observable and ratable. They warn that the validity and reliability of a category in the test should be questioned if half the items in the category are not ratable by that person.

Design

A quasi-experimental design, the nonequivalent control group design, Campbell and Stanley (1963), was employed as it was not possible to randomly assign the subjects to groups. This design involves a pre-test, post-test and an intervening treatment. In this study both groups were administered the WISC-R for the pre-test, the experimental group had received the treatment, or independent variable, which was the integration into a regular school and both groups were post-tested with the WISC-R.

Ideally with this design the treatment should be randomly assigned. Unfortunately this was not possible due to the event having already taken place.

Gay (1976) warns that in this design the lack of random assignment adds sources of invalidity, not associated with the pre-test - post-test control group design, such as possible regression and interaction between selection and variables such as maturation, history and testing. Of particular importance here is the matching of groups. Again unfortunately, due to the small numbers available, manipulation was not feasible. In the review of the subjects, however, it was shown that the three age categories were represented for both groups and that subjects did not differ in the severity of disability or have significantly different mean I.Q. scores. How-

ever, as the range and standard deviations of both groups did show differences, analysis of covariance was chosen for statistical analysis.

Both the stated hypotheses are deductive, directional ones stating in Hypothesis 1 that there will be increased verbal I.Q. scores from those who were integrated into mainstreaming and in Hypothesis 2 that increases in verbal I.Q. will be related to higher motivation, those less disabled, and children showing greater social adjustment. As is common in experimental research the statistics employed were concerned with the acceptance or rejection of the directional hypothesis which was in turn applied to supporting the research hypotheses. The .05 significance level was chosen for all areas except for the subtests of the WISC-R. The .01 significance level was used for these smaller units.

Procedure

'Pre-test' WISC-R scores were collected from the G.F. Strong Rehabilitation Centre records for both the experimental and control groups. The independent variable - the entry into the regular school system and being further exposed to the mainstream of society - had already taken place. The experimental group were located in the regular school setting and the post-test, that is the readministration of the WISC-R, was completed for both groups.

The time period between integration and testing for the experimental group ranged from .5 to 1.9 school years (see Table 7). The mean time period between tests for both groups was 2 years and 1 month. Pre- and post-test intervals are provided in Table 8.

Table 7

Frequencies Showing Time Intervals Between School Integration and Post-Test Dates

Group	n	Interval in School Years	Mean Interval in School Years
Experimental	12	1.9	1.3
		1.8	
		1.8	
		1.8	
		1.6	
		1.3	
		1	
		1	
		1	
		.9	
		.8	
		.5	

Both groups were administered the Interest Scale of the Woodcock-Johnson Psycho-educational Battery. Data regarding the physical limitations of the experimental and control groups were collected from the physiotherapy department of G.F. Strong Rehabilitation Centre using the modified Pulbetic System. Finally all the initial teachers after the integration of the

Table 8

Frequencies Showing Time Intervals Between Pre- and Post-
WISC-R Testing for Experimental and Control Groups

Group	n	Interval		Mean	
		Years	Months	Years	Months
Experimental	12	2	10	2	1
		2	10		
		2	6		
		2	6		
		2	4		
		2	4		
		2	2		
		1	10		
		1	10		
		1	3		
		1	1		
		1	1		
Control	16	3	8	2	1
		3	4		
		3	-		
		3	-		
		2	6		
		2	2		
		2	1		
		1	10		
		1	10		
		1	10		
		1	8		
		1	7		
		1	5		
		1	4		
		1	4		
		1	4		

children in the experimental group, were given the Hurewitz Quick Scoring Behaviour Rating Scale to complete. Ratings were based

on changes during the first year of integration or total time integrated if this was less than a school year.

Data Analysis

To test Hypothesis 1:

One-way analyses of covariance, involving pre- and post-test scores and the decision of school entry, were employed. Hence, scores on the dependent variable, post-test WISC-R results, were adjusted for the initial differences in the pre-test performance. Focus was on the calculation of the main effects from Full Scale WISC-R scores, verbal scale scores and the four subtests of the WISC-R (comprehension, similarities, vocabulary and general information) deemed most influenced by the environment.

Although the time limits imposed in the Performance Scale of the WISC-R make it inappropriate for many of the physically disabled, it was felt that comparison of the results of the test as normally scored would also be useful for practical implications.

To test Hypothesis 2:

A 2-tailed t-test was employed to assess the differences between the experimental and control groups on the interest scale. A one cell t-test was employed to assess changes on the Hurewitz Adjustment Scale for the control group.

Pearson correlations for both groups were also calculated for motivation and grade of severity of disability with changes between pre- and post-test verbal I.Q. scores. The social adjustment scores for the experimental group were also correlated with changes in verbal I.Q. These correlations were used to assess the relationship between intellectual changes and higher motivation, the level of disability and changes in social adjustment.

Further Comparative Statistical Information

An analysis of covariance was completed for sex and verbal I.Q., and age category and verbal I.Q. Pearson correlation coefficients were also completed for grouped age, intelligence level as measured by verbal I.Q. and grade of severity of disability with change in verbal I.Q. scores, to assess the data within wider frameworks.

Further a qualitative analysis of the Comprehension subtest responses was completed, including pre- and post-test responses for 75% of both groups.

CHAPTER IV

RESULTS AND DATA ANALYSIS

In this chapter the results of the study are presented in relation to the two hypotheses stated in Chapter II. Further comparative statistics are also presented. The results will be discussed, within the context of this research study, in Chapter V.

Hypothesis 1

Hypothesis 1 stated that WISC-R scores should be improved after regular class placement over results obtained from the same children when tested earlier in the special school and over children who stayed in the special school. Estimates of cell means for Verbal I.Q., shown in Figure II, display an increase in the Verbal I.Q. for the experimental group and a decline in the control group in this measure.

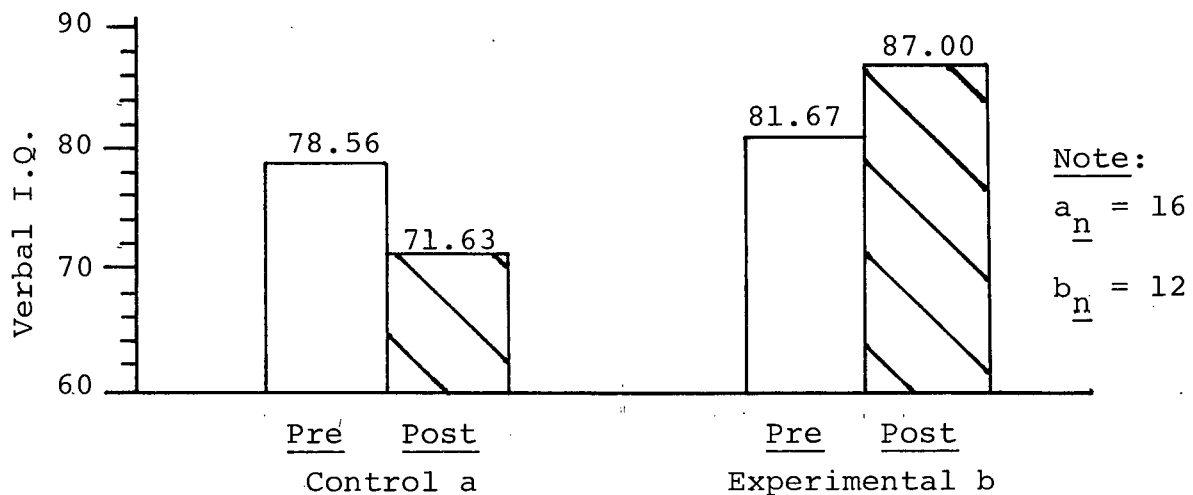


Figure II

Verbal I.Q. Cell Means (pre and post-tests)

Verbal I.Q. change frequencies (see Table 9) show 10 gains and one decline in the experimental group, and 3 gains and 12 declines in the control group. One subject in each group gained the same score on both pre and post-tests.

Table 9

Changes Between Pre and Post-Test Verbal I.Q. Scores and Pre-Test Verbal I.Q.

Group	n	V.I.Q. Changes	V.I.Q. Pre-Test Scores
Experimental	12	14	101
		12	80
		11	91
		7	78
		7	90
		5	65
		4	78
		4	81
		4	90
		3	59
		0	72
		-7	72
Control	16	+5	67
		+3	69
		+1	100
		0	82
		-2	60
		-3	57
		-4	96
		-4	55
		-4	58
		-8	66
		-8	95
		-10	69
		-13	73
		-16	97
		-22	107
		-26	106

As predicted, one-way analyses of covariance showed that there were significant differences in full scale I.Q. and verbal I.Q., pre- and post-test WISC-R scores. Specifically for Full Scale I.Q. $F(1,23) = 7.2, p < .01$ and for Verbal I.Q. $F(1,25) = 21.74, p < .0001$. Thus the null hypothesis - that there would be no significant differences between the pre-test and post-test results for these two groups was rejected, lending support to the experimental hypothesis. (See Tables 10 and 11).

Table 10

Verbal I.Q. Mean Scores by Analysis of Covariance Post-Test)

Group	n	Group Mean	Adjusted Group Mean	<u>SEm</u>
Experimental	12	86.99	85.53	2.07
Control	16	71.62	72.73	1.79

Table 11

Full Scale and Verbal I.Q. Scores by Analysis of Covariance
(Post-Test)

<u>Measures</u>	<u>df</u>	<u>SS</u>	<u>F</u>
Verbal Scale I.Q.			
Equality of Cell <u>M</u>	1	1113.99	21.74**
Error	25	1281.19	
Full Scale I.Q.			
Equality of Cell <u>M</u>	1	281.41	7.2*
Error	23	898.32	

Note: ** $p < .0001$

* $p < .01$

Regarding the subtests of the WISC-R, deemed most influenced by the environment, Similarities ($F(1,25) = 10.57$, $p < .01$), Vocabulary ($F(1,25) = 7.79$, $p < .01$) and Comprehension ($F(1,25) = 16.33$, $p < .001$) showed significant changes whilst Information did not. A further one-way analysis of covariance showed that Arithmetic, the fifth subtest in the Verbal Scale, showed a significant pre-post-test difference ($F(1,25) = 4.39$, $p < .05$) - but not at the required .01 significance level. Thus it appeared that Similarities, Vocabulary, and Comprehension were the main contributors to the significant difference in the Verbal Scale I.Q. Score. (See Table 12).

Table 12

WISC-R Subtest Scores by Analysis of Covariance

Subtests	<u>df</u>	<u>SS</u>	<u>F</u>
Information			
Equality of Cell <u>M</u>	1	22.80	3.94
Error	25	144.53	
Similarities			
Equality of Cell <u>M</u>	1	47.22	10.57**
Error	25	111.73	
Vocabulary			
Equality of Cell <u>M</u>	1	38.19	7.79**
Error	25	122.36	
Comprehension			
Equality of Cell <u>M</u>	1	102.83	16.33***
Error	25	157.39	
Arithmetic			
Equality of Cell <u>M</u>	1	14.59	4.39*
Error	25	83.14	

Note: * $p < .05$, ** $p < .01$, and *** $p < .001$

Hypothesis 2

- a. Motivation measured by the Woodcock-Johnson Psycho-educational Battery.

Two-tailed t-test comparisons showed no significant between-group differences with regard to either school or non-school interest. (See Table 13). A Pearson correlation co-efficient also showed no correlation with change in Verbal I.Q. (Table 14). Thus the null hypothesis was not rejected and the research hypothesis - that increased scores would be related to motivation - was not supported.

Table 13

Motivation by t-Test Analysis of Percentile Rank Scores on the School and Non-school Interest Scales of the Woodcock-Johnson Psycho-educational Battery

Measure	n	M	SD	<u>t</u>
School Interest				
Control	16	58.0	31.19	1.21
Experimental	12	43.17	33.5	
Non-School Interest				
Control	16	41.38	35.85	-0.40
Experimental	12	46.75	39.49	

- b. Level of Severity of Physical Disability Measured by the Modified Pulbetic System.

A Pearson correlation also showed no significant relationship between the level of severity of disability and

Table 14

Pearson Correlation Coefficients Showing Change in Verbal I.Q. Scores with Age Group, Verbal Intelligence Levels, Grade of Disability, Social Adjustment, and School and Non-School Interest

	<u>Change in Verbal I.Q.</u>
	<u>r</u>
<hr/>	
Experimental Group	
Age by Group	-0.63*
Verbal I.Q.	0.2
Grade of Disability	0.21
School Interest	-0.03
Non-School Interest	0.29
Social Adjustment	0.17
Control Group	
Age by Group	0.38
Verbal I.Q.	-0.55
Grade of Disability	0.14
School Interest	-0.48
Non-School Interest	0.17
<hr/>	

Note: * $p < .05$

change in verbal I.Q. (See Table 14). Thus the null hypothesis was not rejected and the research hypothesis - that gains in WISC-R scores would be related to less severity of disability was not supported.

c. Social Adjustment Measured by the Hurewitz Rating Scale.

A one cell t-Test showed significant positive changes in social adjustment scores for the experimental group (t = 9.98, df 9, $p < .001$). A Pearson correlation, however showed no significant relationship between changes in social adjustment and changes in pre and post-test Verbal I.Q. (See Table 14). Thus the null hypothesis that changes in Verbal I.Q. for those integrated would be directly related to social adjustment were not supported.

Further comparative statistical information was collected.

- a. Sex: An analysis of covariance showed that sex was not a significant factor when analyzing changes in Verbal I.Q. scores.
- b. Age: A Pearson correlation showed a significant negative relationship between age group and change in Verbal I.Q. scores of the experimental group. This indicates that the younger group made greater gains on the WISC-R Verbal Scale between pre and post-tests (r $< .05$). There was no significant correlation between age and changes in Verbal I.Q. for the control group (See Table 14).

- c. Intelligence: Intelligence was measured by pre-test Verbal I.Q. scores. A significant negative correlation was found between Intelligence and pre and post-test change in Verbal I.Q. for the control group ($r < .05$). This shows that those who were the more intelligent in the group showed the greatest declines in Verbal I.Q. between the pre and post-tests. No significant correlation was found for the experimental group regarding Intelligence and change in Verbal I.Q. scores (See Table 14).
- d. A Qualitative Analysis of the Comprehension Subtests.
- Subtest responses showed no significant difference between experimental and control groups. Both length of utterance and sub-item response scatter were similar for both groups in pre and post-test responses.

CHAPTER V

SUMMARY AND CONCLUSIONS

Chapter V is a summary of the study and a discussion of results. These results will be examined within a broad theoretical framework in order to explain the findings and discuss their implications. Finally, limitations and suggestions for further research will be given.

Summary of the Study

In recent years there has been a trend towards integration, or mainstreaming, for educating the handicapped child. This involves a child's right to an education in the least restrictive environment with support services appropriate to his needs. Thus the trend is away from the special school and often the special class. Planning these changes however, is difficult for physically handicapped children for whom there are many considerations. It would appear that little research has been completed regarding the efficacy of the integration model particularly concerning the physically disabled.

It was the purpose of this study to look at two groups of physically disabled children who had been in a special school and compare their intellectual abilities after one of the groups had integrated into the regular school. It was

hypothesized that, as several verbal subtests of the Wechsler Intelligence Scale for Children appear to be influenced by environmental stimuli, those integrated into the regular school will have increased scaled scores over those who remained in the sheltered setting. To discuss results within a broader framework it was also hypothesized that gains would be correlated with higher motivation levels, a lesser degree of severity of disability, and better social adjustment.

Specifically the sample was taken of those children who had attended the G.F. Strong Rehabilitation Centre in Vancouver, British Columbia. All subjects required previous WISC-R results that could be collected from hospital records. In all 28 students were eligible for the study - 12 in the experimental group who had been integrated and 16 for the control group. Post-test WISC-R scales were then administered to both groups together with the Woodcock-Johnson Psycho-educational Battery school and non-school interest questionnaire. The Modified Pulbetic System for the assessment of physical disability was completed by hospital physiotherapists for both the experimental and control subjects. Also the Hurewitz Social Adjustment Schedule for the experimental group was circulated and where possible (82%) completed by the initial teacher after integration.

The results of the study are summarized below.

Conclusions of the Study

Within the limitations of the design of this study presented in Chapter IV, the following conclusions were made.

Effects on Intelligence Levels

1. The Physically disabled children who were integrated into regular school from a special school for the physically disabled improved significantly in intelligence when compared to a group who remained in the special school, when this dimension was measured by Verbal I.Q. on the Wechsler Intelligence Scale for Children-Revised.

2. Motivation

There was no significant difference between the motivation levels of physically disabled children in the special school as compared to regular school, as measured by either the school or non-school interest scales of the Woodcock Johnson Psychoeducational Battery.

3. Severity of Disability

There was no significant difference between the experimental and control groups in the level of physical disability. Also there was no linear relationship between the level of severity of disability and gains in Verbal I.Q. in the experimental group or declines in Verbal I.Q. in the control group.

4. Social Adjustment

Although all of the experimental group made gains in social adjustment, the ability to adjust well was not related specifically to the gains in Verbal Intelligence.

Population Characteristics

Sex: Sex is not related to changes in Verbal I.Q. in the integrated or sheltered settings.

Age: In the experimental group the change between pre and post Verbal I.Q. was greatest in the youngest age group (6 - 8 years).

There was no significant age group relationship with changes in Verbal I.Q. for the control group.

I.Q.: It would appear that in the control group those in the average I.Q. range had a significant disadvantage intellectually from being in the special school setting. There was no significant relationship in the experimental group between I.Q. and pre and post-test Verbal I.Q. changes.

Verbal Qualitative Changes: From an analysis of verbal responses on the comprehension subtests there appeared to be no obvious way to differentiate the expressive verbal abilities of the control and experimental groups. Those integrated appeared to score higher in comparison to former testing, whereas the control scored lower, but the integrated group did not appear to be more succinct or more explanatory than their counterparts in the sheltered setting. Similarly

no definite areas could be identified in which the control group significantly lacked information.

Discussion

Pre - Post Test WISC-R Changes

Although it is interesting to find significant gains on the Full Scale Score, and allows comparability under normal standardization procedures, it is important to remember that the performance scale is frequently not appropriate for the physically disabled. This is due to the fine dexterity needed and the speed required, both of which present difficulties for many types of handicap, for example spasticity and ataxia.

Focus therefore will be on the significant changes between the experimental and control groups on the verbal scale.

It is interesting to see that not only did mean V.I.Q. scores for the experimental group increase but that mean scores for the control group declined. This is an important contribution to the decision making process as a double negative is implied for those staying in the sheltered setting; not only may students not have the stimuli to improve but their scaled scores may deteriorate in comparison to their own previous scaled scores. As the mean Full Scale I.Q. of post test WISC-R results of the control group fell into the educable mentally retarded (EMR) range this study can be compared with Myers (1976) and does not support his suggestion that

the special school provides a reasonable educational alternative for EMR pupils. This is reinforced, in this study, by the finding that the most intelligent of the control group (in the average range) declined the most in their Verbal Intelligence level.

This data does however, corroborate the research of Carrol (1967), Walker (1974) and Easton (1979) who found some specific academic gains after integration into a more 'normalized' environment.

WISC-R Subtest Changes

Although the Verbal I.Q. scores of the experimental group, who had integrated into regular school, increased significantly over the control group, who had stayed in the sheltered school environment, the subtest analysis showed variances. The significant increase of the WISC-R Verbal I.Q. was not due to all four subtests deemed most influenced by the environment, that is information, vocabulary, similarities and comprehension. In fact three of these subtests: similarities, vocabulary and comprehension showed a significant difference with the fifth subtest on the verbal scale, arithmetic, also showing some gains.

As the functions and influencing factors on these four subtests are so interwoven it is difficult to present a precise rationale for this result. Suggestions can be formulated however.

In Chapter II a breakdown of the functions and influencing factors of the four subtests: similarities, vocabulary, and comprehension were discussed. In referring back to this, it can be seen that the information subtest is influenced particularly by the range of knowledge developed from a rich environment and extent of schooling. Similarities and comprehension are particularly influenced by the extensiveness of cultural opportunities; social awareness is also stressed as a function of comprehension while similarities involves logical thinking and verbal concept formation. Vocabulary also involves concept formation and language development. It could be argued that the social interactive skills required with regard to the latter three subtests are more likely those that will be initially influenced by the exposure to a broader social spectrum. This rationale ties in with the pattern of response by experimental subjects regarding their integration into regular school. All but one student, who was ambivalent, were intensely enthusiastic about their new school placements. Frequently mentioned areas were the enjoyment of extended peer group interactions and participation in 'regular' social events, particularly in the school setting. This implies social 'normalizations' which should influence comprehension and provide wider environs on which to base verbal concept formation, logical thinking and language development. Thus this exposure ap-

pears to be counteracting the diminished cultural opportunities of the earlier sheltered setting.

With regard to the information subtest three rationales will be discussed. Firstly, because the acquisition of information is a large body of knowledge acquired over a long period of time, the effects of integration might take a greater time period to be realized. Thus it could be argued that the initial focus is on social aspects while a long term benefit would show gains in information. Secondly, one could argue on the other hand, that as the questions on the WISC-R are closer to curriculum materials, this is not an area that has suffered in the sheltered setting. In fact because of limitations in other areas, increased emphasis is placed on formal learning. Thus the extended environment did not show significant effects on these scores. Thirdly, again when viewing the subtest analysis by Sattler (1974), it is interesting that natural endowment is suggested as an influencing factor in Information acquisition. L'Abate and Curtis (1975) also suggest, from findings regarding inter-subtest correlations, that inheritance may be involved in some traits more than others. They mention Information as one likely subtest. Thus it could be argued that the Information subtest is more likely to be stable and would be less likely to change with environmental stimuli; particularly when this area has been of particular focus in the sheltered setting.

In conclusion only speculative ideas can be discussed within this study; particularly as the verbal subtest factors tend to be very closely related. To make more informed judgements, a larger population involving more data, with programmed longitudinal studies, is indicated.

Level of Severity of Disability

Regarding data analysis concerning hypothesis 2, it was found that changes in Verbal I.Q. were not related to the severity of disability. Anderson (1973) noted that this very visible aspect of the child's functioning is often central in the decision of regular school placement from the special school. It is also often apparent in rehabilitation centres that considerably more time is spent on physical considerations than on social, emotional, and educational aspects of the child's situation. Thus, the finding that there was no significant difference between the two groups regarding their physical disability is worth particular mention. It appears that the most disabled, as outlined in the Pulbetic System, are likely to benefit from integration with a regular school from a special school to the same extent as those who are minimally disabled. No significant linear relationships between the gains in Verbal I.Q. in the experimental group or declines in the control group with relation to physical handicap were evident.

Verbal Intelligence Level

Pearson correlation coefficients showed significant negative relationships between change in Verbal I.Q. scores

and intelligence measured by pretest Verbal I.Q. scores for the control group. There were no significant trends for the experimental group.

Both control group posttest mean verbal scale score and posttest full scale score from the WISC-R were in the educationally mentally retarded range. (In fact, the mean scores of these children in the special school were lower than those in the study as pretest verbal scores below 55 were considered not suitable for the study.) The frequency distribution (Chapter III) shows that the greatest declines in Verbal I.Q. scores were by children whose pretest WISC-R scores were in the average range. For example, a Verbal I.Q. of 106 declined 26 points, Verbal I.Q. of 107 declined 22 points, and a Verbal I.Q. of 97 declined 16 points. These scores were those moving towards the mean of the group in the special class. This study would support the conclusions of Findley and Bryan (1971) who reviewed several United States studies and reported that students tend to move towards the mean in academic performance.

It would appear from this study that those in the control group with average I.Q. are being disadvantaged in the sheltered school setting where the mean in intelligence is in the educably retarded range.

This finding should be given special consideration. In a setting which is oriented primarily to physical disabilities aspects concerning educational considerations such as this, may be overlooked.

Age Group

Although no significant relationships were found for the control group, a negative significant linear relationship was found for the experimental group regarding age and changes in pre and post-test V.I.Q.

This indicates that the youngest age group (6-8) made the most positive gains in Verbal Intelligence. These results support Bloom's (1964) findings. He reviewed longitudinal studies of intelligence which used the Stanford Binet and other intelligence tests. He found that data suggested that in terms of intelligence measured at age 17, about 50% of the development takes place between conception and age 4, about 30% between ages 4 and 8, and about 20% between ages 8 and 17. He notes that the effects of the environment appear to be greatest in the early periods of intelligence development and least in the later periods of development. Bloom (1974) states -

"... evidence so far available suggests marked changes in the environment in the early years can produce greater changes in intelligence than will equally marked changes in the environment at later periods of development." (p. 89)

Implications of the Study

The purpose of this study was to produce some data on which to help base decisions regarding the integration of physically disabled children from the special school to a regular school. Analysis of the data collected implies that from an intellectual standpoint there is an advantage in being in the regular school environment for all levels of disability, whether mildly impaired or confined to a wheelchair with minimal hand motion. It must be stressed, however, that this area should not be viewed in isolation; that there are many social, emotional and physical considerations that are crucial regarding the integration process. These considerations, to a greater or lesser extent, are important for all special needs children as shown by Figure III from L'abate and Curtis (1975).

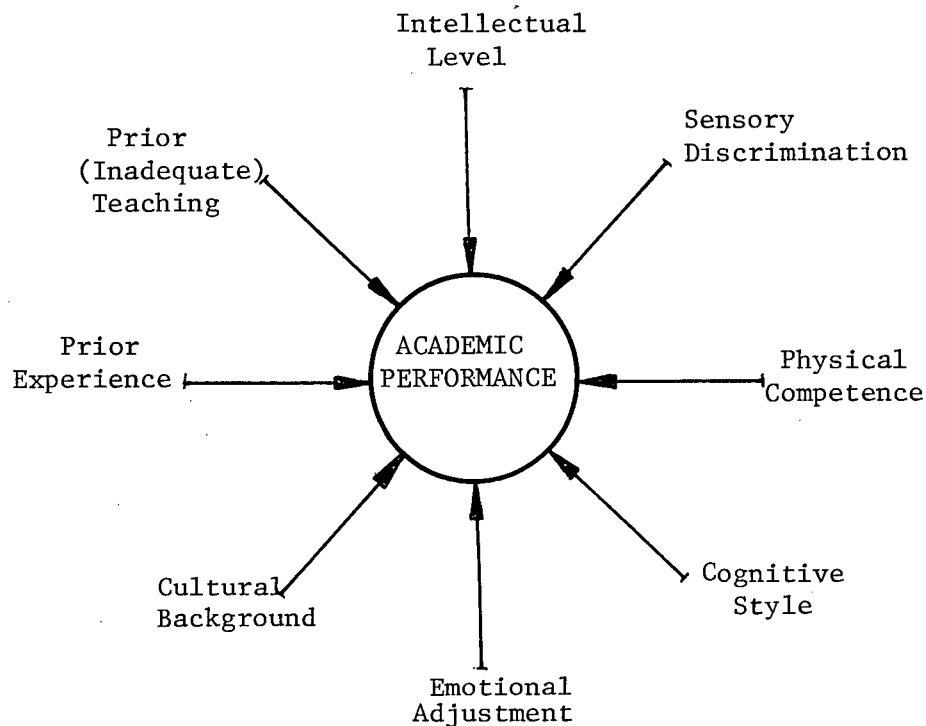


FIGURE III

Schematic Diagram of Factors Affecting Academic Performance

It is important to keep all these aspects in perspective and not let the possibly most visible disability, physical disability, cloud the decision-making process.

It would also appear from these results that regular school placement would probably be appropriate for all the levels of intelligence that were used in this study (range 55-107 V.I.Q.) and physical disabilities that attend the special school. It can be reasoned that these children could easily go to a regular school; with aides to help those with particularly severe disabilities. Although these children will still need specific therapies, these could be provided by itinerant therapists. A successful model for this is provided by the Alberta Children's Hospital in Calgary. The reduction of travelling time and broadening of local peer group contact are also both positive aspects towards encouraging an extension of the normalized environment at home.

The crucial aspect of integration is the support systems available and the integrative procedures with teachers, peers, parents and the child themselves. Weisgerber (1974) graphically illustrated the ecological relationships of the regular classroom, environment and the special class environment in terms of human influences on the handicapped child (See Figure IV) to produce the optimum environment for the child.

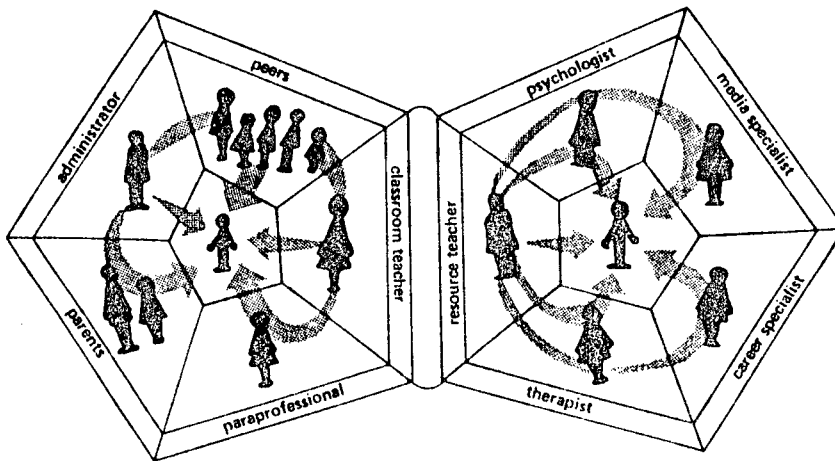


FIGURE IV

Ecological Model of Regular and Special Instructional Teams
Serving the Handicapped Child (Weisgerber, 1979)

In terms of this model the findings of this study appear at a significant era in this province. Of particular importance is the commitment of the Minister of Education in B.C. to integration, encouraging the least restrictive environment for needs approach. Special reference has also been made regarding the desirability of the integration from the sheltered setting with the support staff necessary. Also many school districts are individually undergoing reorganization for the integration of children with special needs and particularly the physically disabled. For example, Fort St. John has an itinerant teacher for the physically disabled, Prince George has several social workers employed by the school board to coordinate the integration of children with special needs. The Vancouver school board has committed themselves to the gradual modification of old school buildings to ac-

ceptable standards for the disabled. New schools under construction are on one level for total accessibility. Finally, in this, the International Year of the Disabled, many projects are being funded for the assimilation and acceptability of the physically disabled into the community.

Limitations

The interpretation of these results must take into consideration certain limitations of the study.

Sample size ($n = 28$) is small for analysis of covariance (Gay, 1976).

The design for this study was weakened by not being able to randomly assigned treatment to groups. It was necessary to take those who had already been assigned to regular school and compare them to those who had remained in special school. As Gay (1976) mentions, this is a common difficulty in educational research. A problem with this approach is that the research may not include some crucial areas. In this study pertinent considerations in the decision to integrate those particular children may have been omitted. These might include, for example, a supportive family or particular personality characteristics.

This lack of random assignment adds sources of invalidity such as possible regression and interaction between selection of variables. These include maturation, history, and testing. Of particular importance here is the matching

of groups. Again this was not feasible as all those for whom pre-test WISC-R results were available, and who still fell into the WISC-R age group for the post-test range, were used (except those below a V.I.Q. of 55).

In Chapter 3, the review of the subjects shows that the three age categories were represented for both groups. The sex ratio, of 7 females and 5 males in the experimental group and 8 of each sex in the control group, was good. The groups did not have significantly different mean VIQ scores. The two groups also showed no significant differences in the severity of disability. To add a further security to results analyses of covariance were used.

Small sample sizes also hindered more in depth analysis regarding the level of physical disability, and different areas of social adjustment. Regarding physical disability analysis, hand function between the two groups as an individual measure would be useful as regular school work requires dexterity and speed. Although this information was collected in the Pulbetic System, cell sizes were too small for analysis.

Analysis of the social adjustment scale was similarly hindered by sample size. The area of social adjustment is mentioned frequently in the literature on mainstreaming with most definiteness stating that mainstreaming must involve

social interaction and acceptance. It is felt that just as a physical disability can place limits on achievement, so can feelings of inadequacy and insecurity, attitudes of rejection on the part of parents, or the ridicule or isolation of peers. The Hurewitz Scale covered these areas and more but again cell sizes were too small to investigate subtest interactions.

Aside from sampling considerations, problems attendant upon the construction of the tests were evident. The Hurewitz scale lacked reliability and validity data. The method of using the same scores for 'some improvement' or 'no need to improve' was ambiguous. Further the diversity of areas covered and the design of using a mean of both positive and negative scores could limit the interpretation of results. (In fact, no negative scores were reported in this study). Regarding the WISC-R, some subtests are more difficult to score than others, particularly the comprehension subtest, although scoring procedures are much improved in the WISC-R over the WISC.

Suggestions for Further Research

The results of this investigation suggest that further study of the problem is warranted. It is suggested that there is a relationship between intelligence and the school environment with decline in the special school and increase

in the regular school. This has significance regarding the decision-making process concerning the transference of the physically disabled from the sheltered setting into the regular school which is close to the mainstream of society.

A longitudinal analysis of physically handicapped children transferring into the regular school would provide increased data with which to analyze these and other significant areas more effectively. This could include effects on score differences after various time periods of integration, for example one, two or three years; as was suggested regarding the possible long term effect on the information subtest.

The areas of social adjustment and the breakdown of levels of severity of disability in terms of upper and lower limbs could be explored. Specific ages rather than age groups could be analyzed.

Further analysis of data regarding placement in a special class or regular class or regular class with learning assistance time would also help give more explicit information on which to base integration decisions.

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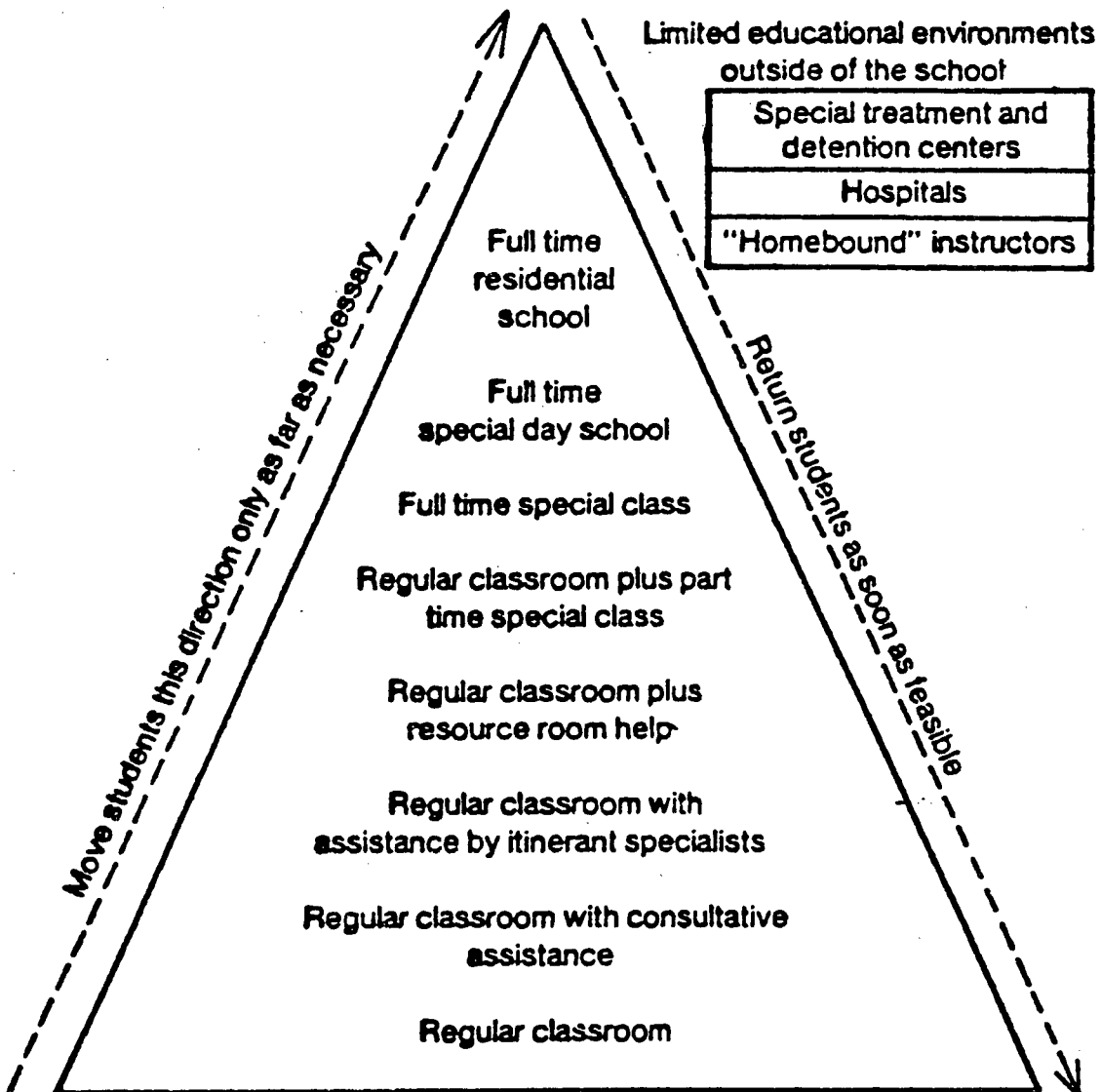
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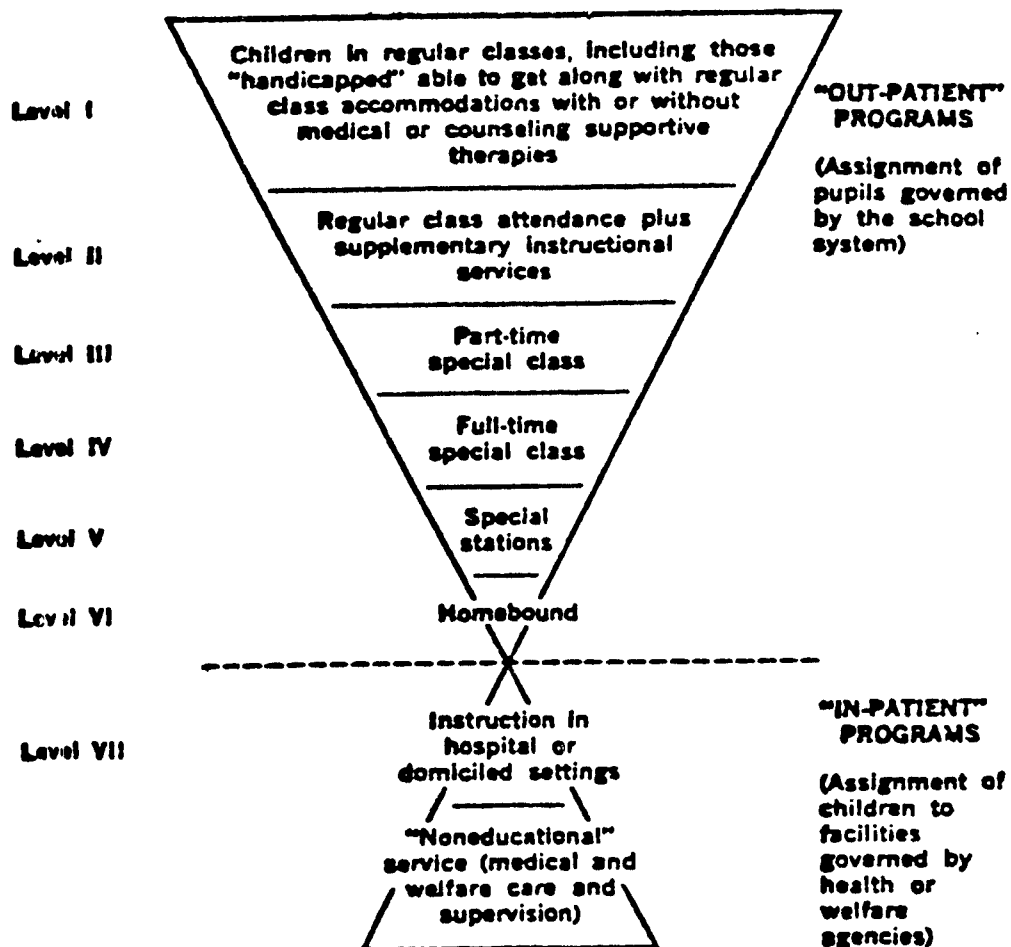
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The Original Special Education Cascade



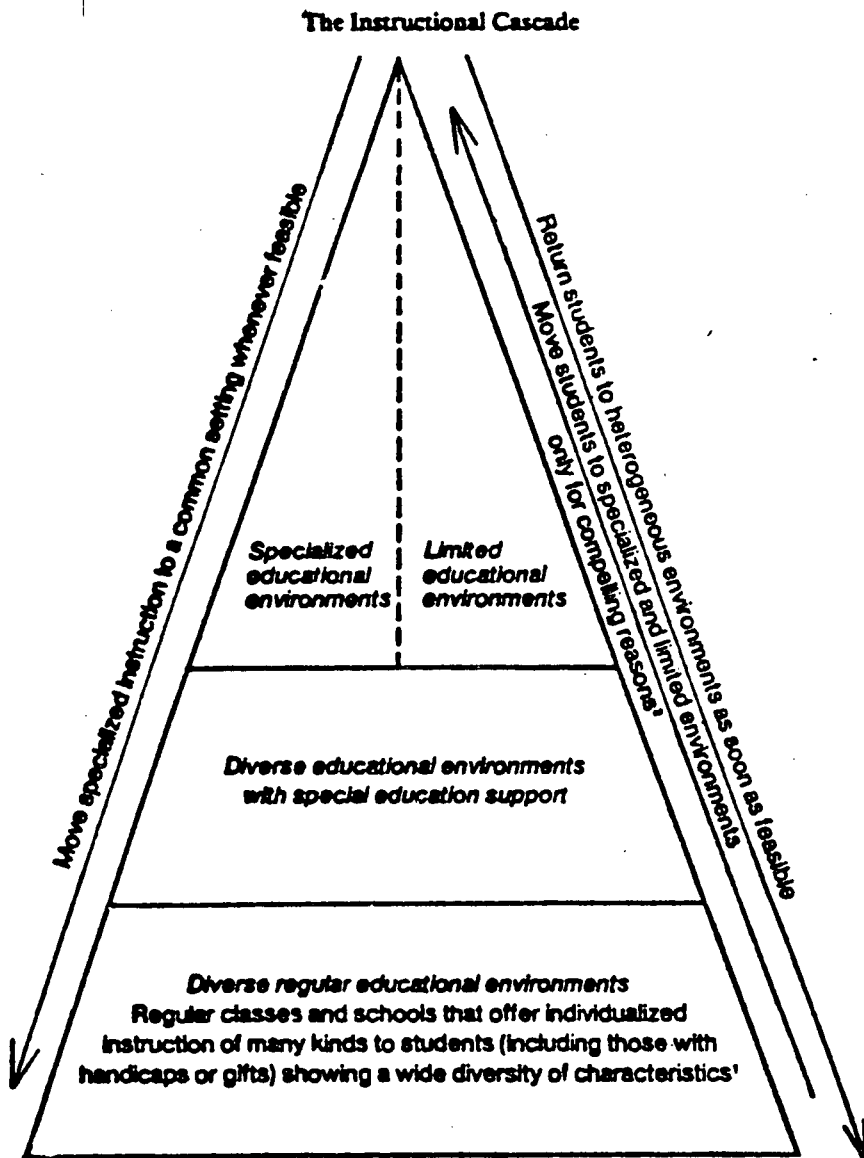
(Reynolds, 1962)

The Cascade System



The cascade system of special education service. The tapered design indicates the considerable difference in the numbers involved at the different levels and calls attention to the fact that the system serves as a diagnostic filter. The most specialized facilities are likely to be needed by the fewest children on a long term basis. This organizational model can be applied to development of special education services for all types of disability.

(Deno, 1970)

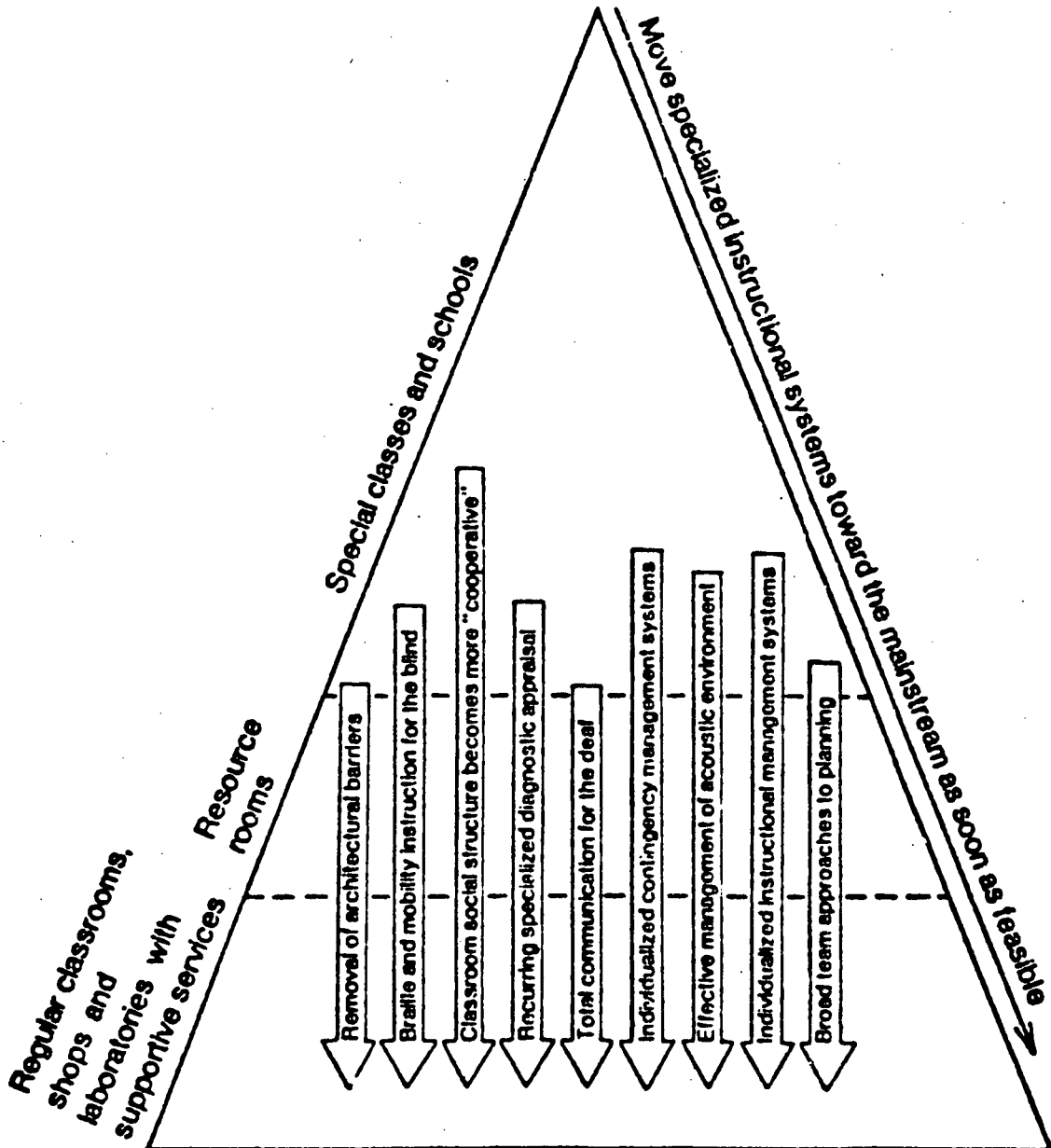


*It is assumed that no educational "place" is impervious to change and development and that through good efforts many of the varieties of specialized and intensive forms of education can be moved into a developing mainstream.

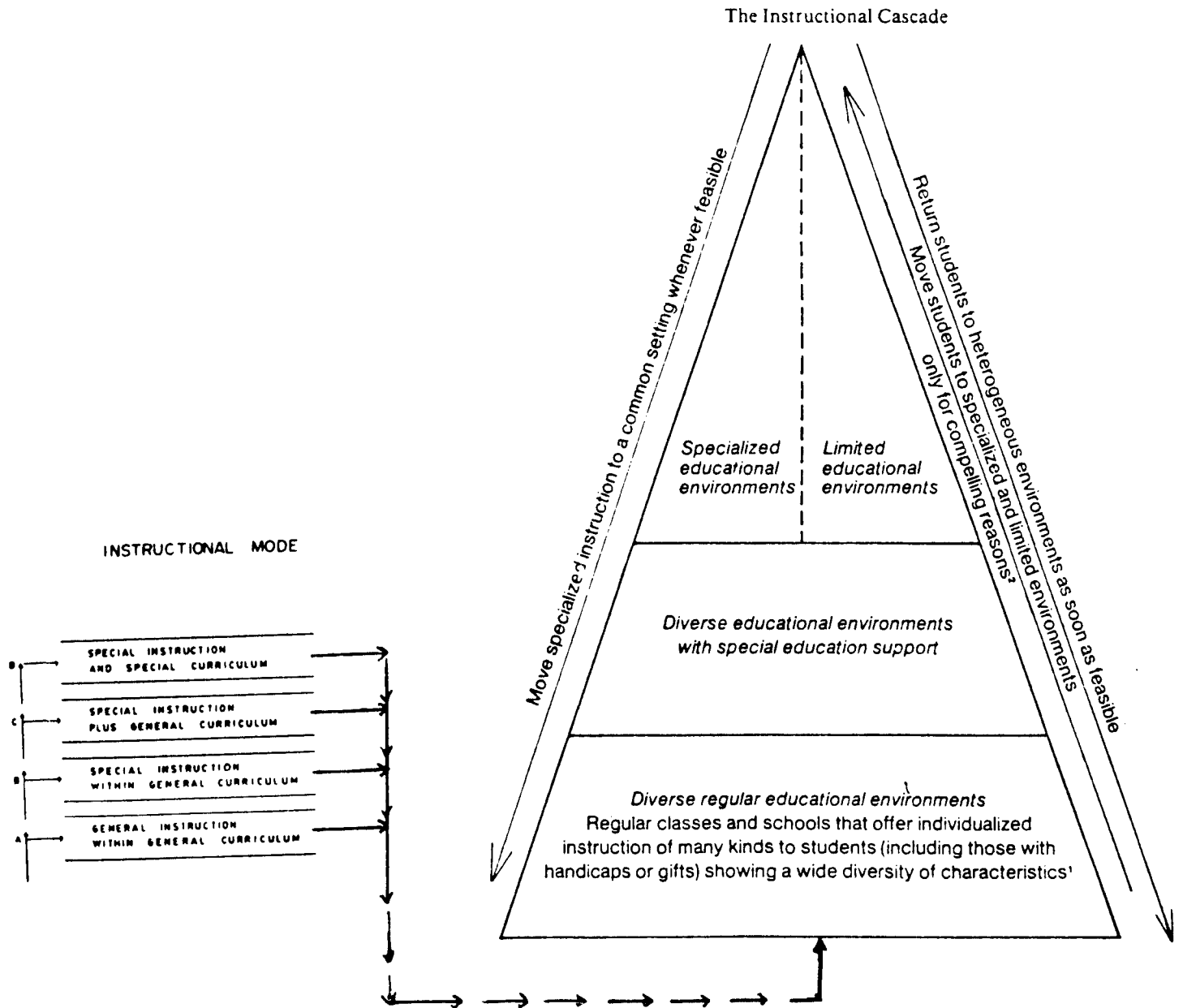
*Here, as in the case of the original cascade, it is assumed that students should be removed from the mainstream only for limited periods and compelling reasons, that when in specialized and limited environments their progress should be monitored carefully and regularly, and that they should be returned to the mainstream as soon as feasible.

(Reynolds and Birch, 1977)

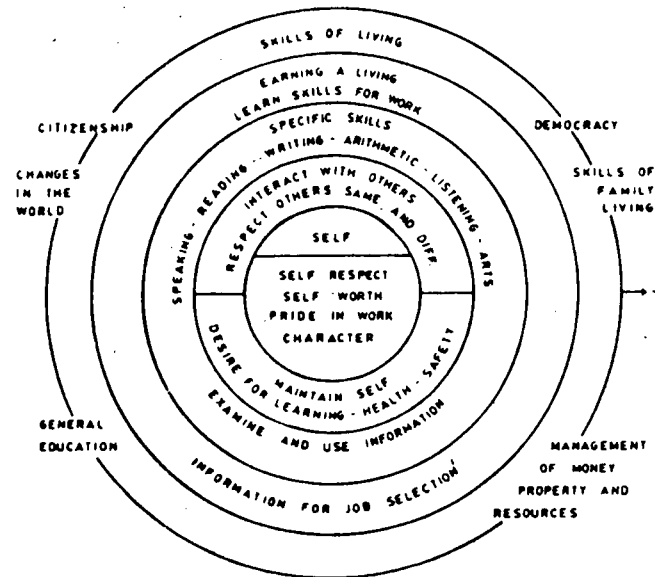
**Changes Occurring in the Cascade (Fewer Specialized Places;
More Diverse "Regular" Places)**



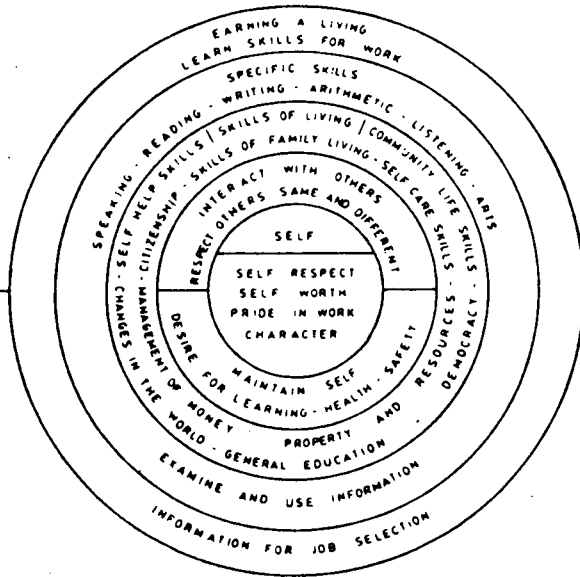
(Reynolds and Birch, 1977)



PHILOSOPHY OF EDUCATION



PHILOSOPHY OF SPECIAL EDUCATION



- D: STUDENT RECEIVES A SPECIAL CURRICULUM FOR ALL INSTRUCTION
- C: STUDENT IS PLACED IN THE GENERAL CURRICULUM AND RECEIVES SPECIAL INSTRUCTION FOR SOME TASKS THAT SUPPLEMENT THE INSTRUCTION RECEIVED IN GENERAL CURRICULUM
- B: STUDENT IS PLACED IN THE GENERAL CURRICULUM AND RECEIVES SPECIAL INSTRUCTION FOR CERTAIN TASKS WITHIN THE CURRICULUM
- A: STUDENT IS PLACED IN THE GENERAL CURRICULUM FOR ALL INSTRUCTION

TEACHERS AND MATERIALS NEEDED BY STUDENTS

DECISIONS

1. WHAT GOALS AND HOW MANY OBJECTIVES WILL STUDENT NEED TO MEET THOSE GOALS ?
2. HOW INTENSIVE AND HOW EXTENSIVE WILL INSTRUCTION HAVE TO BE ?
3. WHAT TEACHERS AND MATERIALS ARE NEEDED BY STUDENTS ?

PERFORMANCE
ON COGNITIVE
AFFECTIVE
PSYCHOMOTOR
TASKS

OBJECTIVES
BASED ON
TASK
PERFORMANCE

MODES
BASED ON
TASK
OBJECTIVES

APPENDIX B - ASSESSMENT OF DISABILITIES

The notes below summarize the criteria used in evaluating the children's functional disabilities on a four-point scale. As stated they are derived mainly from the Pultibec system described by Lindon (1963) which was slightly modified for the purposes of Anderson's (1973) study.

PHYSICAL CAPACITY (HEALTH)

1. Physical capacity, general health, stature, body build, exercise tolerance and endurance, good average to exceptional. Capable of a full day's work. (No person with an overt defect can be placed in this grade.)
(Note that children with functional difficulties but without any overt defect should be recorded under the appropriate quality only. P in these instances would remain grade I.)
2. Physical capacity etc. low to average but within normal limits. If any one or more of these factors are affected or any defect such as scoliosis is present, even if they do not affect general health, the person should not be graded higher than P2.
3. Physical capacity less than in 2 but nevertheless capable of a full day's work if the environment is suitable.
(Open employment likely.)

4. Physical capacity etc. reduced to an extent of rendering the person incapable of a full day's normal work or travelling without special facilities. (Probably sheltered employment.)

UPPER LIMBS

1. Normal.
2. Slight loss of intricate skill due to loss of co-ordination but power and range normal for manual work - able to feed and wash.
3. Range and/or power limited as well as skill - not able to feed but can grasp objects.
4. Severe loss. Useless for all practical purposes (includes amputations).

LOCOMOTION

1. Able to use limb/limbs in a completely normal way.
2. Slight difficulty - able to run and walk but with less than usual dexterity and speed. May have some difficulty with stairs and crowds. Distance usually travelled in everyday life is not a problem.
3. Moderate difficulty. Able to walk only short to moderate distances (i.e. approximately 20-200 yards) without

APPENDIX B

a rest at a slow pace and if necessary with aids.

Tendency to fall rather easily. Running impractical but possible with one good limb. Stairs take time - some help may be needed.

4. May be able, with close supervision, to walk a few steps and to stand when holding on or supported. Stairs and gradients virtually impossible. Suitable building and transport necessary. Wheelchair needed when help not available, or all the time.

TOILET

1. Normal.
2. Nocturnal enuresis - no special arrangement for day care.
3. Continent for practical purposes with, if necessary, aid of a urinary bag or catheter for bladder control or special training for bowel control. Special arrangements of width and space of toilet arrangements or hand rails etc. render child independent of further assistance. Able to attend to himself with special provisions.
4. As in 3, with additional problems such as manipulative difficulties, necessitating help in addition to, if necessary, special arrangements as in 3.

Name: _____

Class: _____

Date: _____

Evaluated By _____

Please use the rating scale below. Place a number rating in each box. If you cannot rate a response because of insufficient information place a (?) in the box.

RATING SCALE:

- 1. Behavior deteriorating, extreme response
- 0. Little or no improvement (seldom)
- 1. Fair improvement (sometimes)

- 2. Good improvement (usually)
- 3. Excellent improvement (almost always)

A. SOCIAL HABITS

- 1. Desire to relate to others and be accepted. _____
- 2. Acceptance by others. _____
- 3. Level of Social Maturity. _____
- 4. Response to social group controls and norms. _____
- 5. Degree of self-confidence in social relationships. _____
- 6. Sharing things, bringing things to class. _____
- 7. Accepting social and work responsibilities. _____
- 8. Social leadership. _____

*Rate either item 9 or 10 (whichever applies). Use this scale: 3: seldom, 2: sometimes, 1: usually, 0: almost always, -1: always.

- *9. Submissiveness to peers. _____
- *10. Dominates others or is aggressive verbally or physically. _____

Total: _____

Use average scores. Divide total by no. of responses.

B. RELATIONSHIP WITH ADULT

- 1. Response to individual praise and attention. _____
- 2. Willingness to share personal experience with adult. _____
- 3. Reaction to limits. _____
- Total: _____
- Average: _____

D. EMOTIONAL RESPONSE

- 1. Response to inner controls: degree of freedom to express self and emotion _____
- 2. Degree of self-confidence in new situations or in trying something new. _____
- 3. Ability to accept constructive criticism. _____

Rate items 4-8 using this scale:
3:Seldom, 2:Sometimes, 1:usually,
0:almost always, -1:always

- 4. Need for special attention. _____
- 5. Need for personal approval. _____
- 6. Need for affection & love. _____
- 7. Appears guilty and puts self down. _____
- 8. Mood swings-cries easily, anger-fearful, sad-happy. _____

Total: _____

Average: _____

E. WORK HABITS AND ACHIEVEMENT

- 1. Degree of organization in work and study habits. _____
- 2. Completion of work. _____
- 3. Degree of self-confidence in trying new work. _____
- 5. Subject improvement. _____
- 6. General attention span. _____
- 7. Response to special attention and help. _____
- 8. Use of potential. _____

Total: _____

Average: _____

APPENDIX C

C. RELATIONSHIP WITH PARENTS

(Note if there is a poor relationship
with one of the parents.) _____

Parent-child relationship

1. Parent's view point. _____
2. Child's view point. _____
3. Parent's interest in work. _____
4. Parent's follow through and consistency. _____
5. Quality of parental discipline. _____
6. Parental acceptance of child's abilities and limits. _____

* Rate either item 7 or 8 (whichever applies).
Use this scale: 3: seldom, 2: sometimes,
1: usually, 0: almost always, -1: always.

- *7. Parental over-protection. _____
- *8. Parental neglect. _____
- Total: _____
- Average: _____

SUMMARY

- | | Change |
|-----------------------------|--------|
| A. Social Habits. | _____ |
| B. Rel. with adult. | _____ |
| C. Rel. with parents. | _____ |
| D. Emotional response. | _____ |
| E. Work Habits. | _____ |
| F. Gen. Appearance & Health | _____ |
| G. Creative Media. | _____ |
| Total: | _____ |
| Change ± | _____ |

F. GENERAL PHYSICAL APPEARANCE AND HEALTH

1. Self-care: dress, neatness and health. _____
2. Posture. _____
3. Motor Coordination. _____

Rate items 4-8 using this scale. (Rate either item 4 or item 5). 3: seldom, 2: sometimes, 1: usually, 0: almost always, -1: always.

4. Lethargic. _____
5. Hyperactive. _____
6. Nervous habits - tics, etc. _____
7. Somatic complaints: rashes, headaches, stomach-aches. _____

Total: _____
Average: _____

G. USE OF CRAFTS AND CREATIVE MEDIA

1. Shows interest and ability in use of new creative material. _____
2. Plans use of materials. _____
3. Development of new interests and hobbies. _____
4. Care of materials. _____
5. Acceptance of product made. _____

Total: _____
Average: _____

APPENDIX C

Directions for Scoring the Rating Scale

The scale should be used after you have had a chance to observe the child for one or two months. The scale is used to show if there has been any improvement or change in the child's functioning. (See the directions on the rating scale before you read the rest).

The rating scale includes two parts: The first is a qualitative rating as fair or good improvement. The second part is concerned with the frequency of these responses. A more objective rating will be obtained if you keep both of these aspects in mind as you are rating a child. For example: if a child usually shows good improvement in an area, the rating would be 2 (good improvement). If the child shows some good changes, but these changes occur only sometimes, you would rate him 1 showing (fair improvement).

In the same manner if a child usually shows good improvement, but he regressed in behavior once, you might still rate him 2 showing good improvement(usually).

Use the Main Rating Scale for all the items unless otherwise noted. A few items are rated only on a frequency scale. These items are specifically marked with an asterisk.

If an area of adjustment is generally good and there is no need for improvement, you may mark it with a 2 or 3. For example: a child may always dress neatly and needs no improvement. You would therefore rate this child with a 2 (Good) or a 3 (excellent).