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ASSESSMENT OF SEVERELY AND PROFOUNDLY HANDICAPPED PERSONS: IMPLICATIONS FOR PROGRAMMING

by

ASHLEY SMYTH

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH IN

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ABSTRACT

In September 1977, the Alberta Provincial Government, through the Division of Services for the Handicapped, Edmonton Region, implemented the Resources for the Dependent Handicapped (R.D.H.) Project. The Project was designed to provide developmental resources for dependent handicapped people in as normal an environment as possible.

This study presents assessment data for dependent handicapped persons involved in the R.D.H. Project, in terms of their behavioral and physical development prior to and following the introduction of the Project. Further, the study examined the relationship of communication and gross motor skills to other functional skill areas, and assessed the extent to which overall levels of competency were influenced by competency in these two skill areas.

Specifically, subjects were assigned to two treatment groups. Treatment Group #1 subjects became involved in the R.D.H. Project after Assessment #1. Treatment Group #2 subjects did not become involved in the R.D.H. Project until after Assessment #2. Many of the subjects comprising both Treatment groups had received little or no programming prior to entry into the R.D.H. Project. Pre-post intervention effects for each of the Treatment groups, in each of the skill areas defined by the criterion referenced assessment device, were then determined.

The criterion-referenced assessment battery was designed to test skills in five major curricular areas: Receptive/Expressive communication skills, primary/advanced Pre-academic skills,

primary/advanced Gross Motor skills, Self-help and Socialization skills. It was administered on a long-term basis (once every 4 - 6 months) in order to monitor the progress of each of the subjects involved in the R.D.H. Project. The medical and health status of each subject was also examined at the time of each assessment.

Results of the criterion-referenced assessment indicated that Treatment Group #1 subjects made significant gains in each skill area except for Receptive communication and Socialization skills, as a result of program intervention.

In terms of Communication skills, results indicated that Receptive communication skills were significantly correlated with Expressive communication, primary Pre-academic and Socialization skills. Thus, communication skills may constitute important prerequisite or corequisite skills for early problem solving and social responsiveness.

In terms of gross motor performance, results indicated that primary Gross motor skills were significantly correlated with Expressive communication, primary Pre-academic, Self-help and Socialization skill areas. Further research may indicate a causal relationship between gross motor performance and competency in other skill areas.

In terms of the general medical and health status of each of the subjects, results indicated that the R.D.H. project was having a positive effect. There was a reduction in the use of antibiotics, anti-convulsants, and tranquilizers. Moreover, health ratings for all subjects remained within the stable to moderate categories.

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CHAPTER I

INTRODUCTION

Background

Dependent handicapped persons represent a heterogeneous population varying not only in chronological age, but also from profound to mild degrees of handicap in cognitive, sensory, physical and adaptive behaviour. They have a life style and an existence that is unique to less than 1 percent of the population (Kysela and Norman, 1978). In recognition of this perspective, service delivery programs should identify and register such persons, whose needs should be the focal point of the system (Neisworth and Smith, 1978). Also, the initial and continual evaluation and assessment of needs must allow for the appropriate match of the individual to the array of services being provided.

In recent years, the Alberta Provincial Government, through the Department of Community Health and Social Services, Division of Services for the Handicapped, implemented a long-term plan to provide developmental resources for dependent handicapped persons. These services were intended to: "prepare the dependent handicapped person for entry into more advanced day training programs in their community, and the least restrictive residential alternatives available to them in the community" (Kinkaide, 1977 p.2). Central to the character of these services was the desire to provide as normal an environment as possible for dependent handicapped persons. The

concept of the Resources for the Dependent Handicapped project was to develop and maintain training, residential and family support services for dependent handicapped persons in the city of Edmonton.

Key to this project was the establishment of five small Resource Centers, each of which would provide developmental training in life skills, for 30 or so handicapped persons from a surrounding service area, of 50,000 persons (Kinkaide, 1977). The handicapped persons ranged in age from 6 years to young adults in their 20's. Each resource center served approximately 10 persons living at home. The other 20 handicapped persons were attached to group homes within the service area.

The major objectives of the project, as outlined in the Edmonton Regional Office of Services for the Handicapped proposal to the Edmonton Public School Board, were as follows -

1. Foster development of adaptive behaviour thereby preparing each person for possible entry into more advanced educational and vocational training programs;
2. To ensure that the opportunities for training and development support the person's relationship with his family, his neighbourhood and his community;
3. To encourage the involvement, advocacy, and organization of concerned parents;
4. To provide inter-relationships of the persons and the Center with the community, its people and services;
5. To serve as a focus for co-ordinating program, residential, and family support services (for the dependent handicapped) within a designated service area.

This study attempted to assess the impact of prescribed

educational and residential programming for dependent handicapped persons who were attending the Development Resource Centers in the City of Edmonton. The curriculum emphasized functional skills -- those frequently required for daily living -- as a means of preparing the handicapped person to function as independently as possible in school, at home, and in the community. The Dependent Handicapped Curriculum Guide (Alberta Education, 1981) indicated that the curriculum contained developmental sequences of skills (ranging from simple to complex) based upon normal child development patterns in Motor skill areas, Communication, Self-help, Concept-formation skills, Socialization skills, Purposeful activities, e.g. selection and choice, travel and leisure activities.

In attempting to assess the impact of the curriculum on the individuals involved, four possible testing devices were reviewed, namely the TARC System (Sailor and Mix, 1975), the Balthazar Scales (Balthazar, 1971), the Uniform Performance Assessment System (White, Edgar and Haring, 1978), and the Learning Accomplishment Profile (Griffin and Sanford, 1975).

The UPAS (White, Edgar and Haring, 1978) was selected as being the most appropriate criterion-referenced assessment device. However, the UPAS was then modified to conform to the constraints of the population receiving the services of the Resource Centers. For example, additions were made to the Communication and Social Skill categories due to the fact that the original categories did not go

low enough to assess some of the subjects. Scoring systems were revised. The UPAS was designed to be used as a continual assessment profile where the teacher codes (+) indicating that the student has mastered a skill or (-) meaning that the student does not meet the criterion for passing an item. The revised scoring profile enabled the assessor (rather than the teacher) to indicate a score of 5 or 0; 5 indicating that the objective specified has been met, while 0 indicates that the objective has not been met. Further revisions are illustrated in Chapter IV (Table 15). Scoring systems were revised to aid computer analysis of individual and group scores.

The R.D.H. assessment format aimed at providing information about the pattern of growth and change experienced by the subjects, prior to and following the introduction of the Resources for the Dependent Handicapped project, which serves as the independent variable. Such an evaluation allowed for a determination of skill development and knowledge acquisition by the subject in a structured setting.

Statement of the Problem

This Study attempted to report the impact of the Resources for the Dependent Handicapped project in terms of gains in performance, in each of the skill areas identified by the criterion-referenced assessment device, using pre-posttest measures of performance. It also examined the health status of the subjects prior to and after intervention, in order to determine the impact of special community services (such as physiotherapy, orthotics and medical assistance)

offered by the program.

Furthermore, research findings of this Study indicated that levels of communication and gross motor performance may significantly affect performance in each of the skill areas identified as crucial for development, namely pre-academic, social and self-help skills. The design of this study allowed for such implications to be considered.

Limitations

The primary reportable data upon which subject progress was measured were pre-post comparisons using the criterion-referenced assessment device. Although pre-post comparison of the criterion-referenced assessment scores provided a meaningful representation of subject change, this study was unable to account for the classroom or group home variables which may have contributed to this change.

A second limitation concerns the lack of random selection of subjects to Treatment groups. Decisions as to placement and entry into the program were made prior to the request received to evaluate the impact of the program of the individuals involved. Furthermore, ethical considerations for the handicapped individual seemed to almost preclude the opportunity for random assignment to the Treatment groups. Bricker and Dow (1980) point out that the lack of appropriate controls places unfortunate restrictions on the meaning of such findings.

A third limitation concerns the scarcity of tester reliability data. Due to the longitudinal nature of the overall project of which this Study forms a part, and the high turnover of testers involved in assessing individuals involved in the program, tester reliability checks were sporadic rather than consistent.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

Many special educators feel that traditional psycho-educational evaluation has contributed little towards solving the educational problems of handicapped children. Hamilton (1979) has indicated that the administration of an intelligence test to severely or profoundly handicapped children is generally superfluous and typically provides little educationally relevant information. Test results merely confirm the more important criterion information already obtained in the classroom (Haywood, Filler, Shipman and Catelanat, 1975), and do not provide information that can be used by a teacher to plan a child's education (Filler, Robinson, Smith, Vincent-Smith, Bricker and Bricker, 1975).

Within this chapter, a review will be made of very special handicapping conditions of young severely and profoundly handicapped persons, and the implications of such conditions when static rather than dynamic approaches to measurement of ability are adopted. An alternative approach to the assessment of school age severely and profoundly handicapped children, together with a rationale for adopting such an alternative, will also be examined.

Impact of the Education for All Handicapped Children Act (P.L. 94-142)

Special educators have typically classified the mentally retarded with whom they work into two broad categories: the "educable

mentally retarded" (EMR) and the "trainable mentally retarded" (TMR). However, because of recent federal legislation in the U.S.A. especially the landmark "Education for All Handicapped Children Act", P.L. 94-142, new demands have been placed on the special education community.

Today, all handicapped children are entitled to a free and appropriate education at public expense -- as are all other children. Until recently, children usually had to be toilet-trained and be able to communicate in order to be admitted even to a TMR class. Children functioning at lower levels were left to be served by mental health facilities, rather than by education agencies. However, the Education for all Handicapped Children Act, P.L. 94-142, has forced a "broadening of the responsibility of departments of education, requiring them to provide programs for these lower functioning children" (MacMillan, 1977). This increased responsibility has, in part, been due to a growing demand for community day programs for dependent handicapped persons of all ages as a result of deinstitutionalization, together with increased parental demands for developmental day programs and generic support services.

Definition and Classification of Severely, Profoundly Handicapped Persons

A variety of factors considered singly or in combination, have imposed limitations on the valid assessment of children with severe

handicaps. First, there is a need for a clearer classification of what constitutes severe and profound handicapping conditions. This need was indicated in the forward of the disease classification manual of the World Health Organization (1967) which states that,

> '. . . classification is fundamental to the quantitative study of any phenomenon . . . uniform definitions and uniform systems of classification are prerequisites in the advancement of scientific knowledge . . .' (page viii)

Of course, the real test of classification is to what degree of utility it may be applied to a particular condition (Salvia and Ysseldyke, 1978). For example, a child designated as severely or profoundly handicapped is perceived as one who will be unable to achieve any degree of independence as an adult, who remains totally dependent on others and who requires constant supervision. It is clear that a statement such as this does little to provide a positive classification for treatment or placement. Moreover, a child with multiple defects may only be handicapped in one way (socially) whereas another child with a single disability may have multiple handicaps (psychological, educational, social - Simeonsson, Huntington and Parse, 1979). Sontag, Burke, and York, (1973), describe severely handicapped students as:

> '. . . those who are not toilet trained; aggressive towards others; do not attend to even the most pronounced social stimuli; self-mutilate; ruminate; self-stimulate; do not walk, speak, hear or see; manifest durable and intense temper tantrums; are not even under the most rudimentary forms of verbal control; do not

> imitate; manifest minimally controlled seizures; and/or have extremely brittle medical existences.' (page 21)

Wilcox (1979) points out that another strategy has been to define severely handicapped, by reference to an absolute level of functioning. Thus, the severely handicapped are variously defined as those who do not demonstrate the developmental competence displayed by the average two year old (York and Williams, 1977) three year old (Robinson, 1976) or six year old (Haring and Cohen, 1975). The American Association of Mental Deficiency (AAMD) definition in its insistence upon the determination of deficit in adaptive and/or social competence as necessary for the diagnosis of mental retardation represents a significant departure from earlier classification systems which relied upon measured intelligence alone (Filler, Robinson, Smith, Vincent-Smith, 1976). In terms of measured intelligence severely retarded persons are defined as having an IQ ranging from 20-35 on the Stanford-Binet and Cattell and 29-35 on the Wechsler scales. Profoundly retarded persons are described as having IQ ranges up to 19 on the Stanford-Binet and Cattell, and up to 29 on the Wechsler scales.

The AAMD classification scheme distinguishes between severe and profound levels of mental retardation in terms of both IQ ranges and adaptive behaviour characteristics. Neisworth and Smith (1978) indicate that the primary difference is in the degree of functional impairment. The severely retarded child of pre-school age will

evidence poor motor development, minimal speech, an inability to profit from training in self-help, and poor socialization characteristics. The profoundly retarded pre-schooler will typically represent "gross" retardation in all areas, and will usually be in need of nursing care to satisfy the most basic bodily requirements. Whereas, by school age, the severely retarded child will be able to communicate to some extent, and be able to be trained in basic health habits, the profoundly retarded child will respond to training and self-help instruction in only a very limited way (Neisworth and Smith, 1978).

Limitations of the Child

A source of concern is the level of biological dysfunctions and organic difficulties which the severely and profoundly handicapped child brings to the test situation (Hamilton, 1979). For example, the profoundly handicapped child will often only respond minimally to external stimulation. Furthermore, the profoundly handicapped child may be unable to walk, speak, hear or see; may manifest minimally controlled seizures; may have extremely brittle medical existences; may self-mutilate; ruminate; self-stimulate (Sontag, Burke, and York, 1973). Another problem arises when intelligence is evaluated in terms of level and quality of test performance. The more severely handicapped the child is, the more likely it is that test performance will be inhibited by the handicap. If a test has not been standardized on a group of handicapped individuals for whom it is

used, then one cannot judge the extent to which the test causes the disability to interfere with typical performance.

Due to the peculiar limitations of the severely and profoundly handicapped child, assessment procedures need to be carefully designed. The nature of the defect, disability or handicap may also be perceived as being socially aversive, thus reducing the child's chances for critical interaction. It is these kinds of factors which need to be accounted for when assessing performance. Gould (1975) states that physical, sensory and/or neurological impairment not only limits performance, but also creates a developmental handicap in terms of marked discrepancies between different developmental areas.

The number and complexity of drugs employed in controlling behaviour, bacterial infection and seizure activity, is large. The side effects can include jaundice, drowsiness, hemotological disorders, cardiovascular problems, central nervous system reactions, allergies, endocrine disorders, and dermatological problems. In most cases, because communication is so limited, the severely and profoundly handicapped child is incapable of drawing attention to his various feelings or reactions as a result of drug treatment (Neisworth and Smith, 1978). Research of the effects of prolonged drug-treatment has not as yet demonstrated a significant relationship between drug management and child functioning, although there are negative implications. For example, Landesman-Dwyer and Sachett (1978) systematically documented drug treatments of profoundly

retarded subjects. Although they did not carry out analyses to explore drug/behaviour relationships, nevertheless Landesmann-Dwyer and Sachett indicated that prolonged drug treatment contributed to within-individual variability in performance of the subjects.

Tests to Assess Intellectual Functioning

Many different types of tests currently being used to provide a decision maker with information about the severely and profoundly handicapped child. There is at present a clear distinction between two major categories of tests: norm-referenced and criterion-referenced devices. In broad terms, however, tests are a predetermined collection of questions on tasks to which predetermined types of behavioural responses are sought (Salvia and Ysseldyke, 1968).

The characteristics of severely and profoundly handicapped children have generally made it inappropriate to assess them with instruments designed for their chronologically aged peers. Norm-referenced testing is always comparative, and for that reason it is extremely important that those who use such tests and test information be aware of the groups on whom the tests were standardized. This of course raises questions concerning the validity of assessment using norm-referenced procedures with special populations. In a nationally normed achievement test, test items are selected on the basis of what is taught in the majority of classrooms across the nation. Test items should reflect the degree or emphasis

given to skills within the classroom. The aims of Special Education are to develop curriculum and methods of instruction suited more to individual needs, and may, therefore, be rather different from regular education (Baine, 1980). Thus, a nationally normed achievement test may prove invalid in its applicability to Special Education depending on the degree of difference between an average national classroom and a special classroom. Moreover, in the process of standardizing a test it is administered to a representative sample of the type of subjects for whom it is designed. This standardization sample serves to establish the normal or average performance level expected of a representative group. If a test has not been standardized on a group of individuals e.g. severely and profoundly handicapped persons, for whom it is used, then results cannot be regarded as accurate, as test questions may not reflect skills which have been taught (Baine, 1980) thus reducing its validity i.e. degree to which the test serves the purpose for which it is used.

The American Association on Mental Deficiency (AAMD) has stressed the importance of taking into account intellectual functioning together with deficits in adaptive behaviour when dealing with severely and profoundly handicapped persons. For utilitarian reasons, the questions arises as to which assessment method or tool may combine both these areas. Certainly the AAMD scheme provides no procedures for combining measured intelligence and adaptive behaviour

into a single index or level of retardation (Warren, 1977). Adams (1973) states that an inherent danger exists where psychologists may resort to using only intelligence testing to determine level of retardation. However, Adams only investigated a small sample of psychologists under the supervision of one chief psychologist, all involved in the determination of level of retardation for statistical administrative purposes, rather than for individual program planning.

In testing severely and profoundly handicapped children an examiner is faced with two basic questions. Is he concerned with gaining an index of the student's relative standing to others, or in discovering the student's actual level of mastery (MacMillan, 1977)? The second question has caused both educators and psychologists to adopt "criterion-referenced assessment approach". The essence of criterion-referenced testing is that it provides a well defined domain of behaviours to be delineated, so that an individual's performance may be ascertained in relationship to a particular behaviour domain. Popham (1975) states that such a definition as a "well defined behaviour domain" is quite limited for it infers one particular learner behaviour. A more serviceable conception of a "well defined behaviour domain" refers to a class of behaviours such as "the ability to ask for names of objects".

Norm-referenced testing is concerned with correlations and prediction. Items are selected to form an efficient and easily administered scale and there is no assumption that teaching someone

to respond correctly to the test items will in itself generate a competency (Hively, 1975). A criterion-referenced assessment measures a student's development of particular skills in terms of levels of mastery. Ideally, items are linked directly to specific instructional objectives, and thereby facilitate the writing of objectives. Assessment items sample sequential skills, i.e. ranging from simple to complex skills within the same behaviour domain, thus enabling a teacher not only to know the specific point at which to begin instruction but also to plan objectives that will follow a logical developmental sequence.

There are many norm-referenced tests on the market which are used to assess intellectual functioning. The ones used most often in the field of mental retardation are the Stanford-Binet (Terman and Merrill, 1973); the Wechsler Intelligence Scale for Children (WISC) (Wechsler, 1974) and the Wechsler Adult Intelligence Scale (WAIS) (Wechsler, 1955). However, the IQ scales provided by the WISC and the WAIS are only useful to IQ 45, discounting their usefulness among a population with an (AAMD) IQ of 35 and below (MacMillan, 1978).

The more reliable norm-referenced tests have a strong underlying theoretical base. For example, Meeker (1969) used Guilford's (1967) 'Structure of Intellect' model to classify the kinds of behaviour sampled by the Stanford-Binet. A norm-referenced test such the Binet -- used most often among pre-school infants and children, uses age scales, i.e. items are grouped according to expected performance at

different age levels. The test is standardized based upon large groups considered to be a representative sample (Salvia and Ysseldyke, 1978). However, an essential problem is concerned with the 'age concept'. Age represents experience, and a definition of biological and psychological time stated in terms of a chronology which begins at birth. Through the use of the age scale, the age of individuals can be comparatively fixed, but does not identify how an individual progresses from one chronological age to another or what factors influence the course of that development (Siqel, 1979). Furthermore, any age-normed material may easily misjudge the source of the child's functional impairment, in that the emphasis of a norm-referenced test is on the relative standing of individuals, rather than on absolute levels of mastery or content.

Hamilton (1979) has indicated that standard intelligence tests (such as the Peabody Picture Vocabulary Test, the Stanford-Binet Intelligence Scale, and the various Wechsler Tests, each of which is commonly used for mentally retarded persons) compare children with respect to their relative mastery of the products of prior learning (Haywood et al, 1975). He emphasizes that such an approach makes a number of assumptions which are rarely satisfied when testing severely and profoundly handicapped children:

1. The children have had an equal opportunity to learn similar skills and acquire similar information.
2. They are equally motivated to learn the information and skills.

3. They are equally motivated to exert themselves in a test situation and equally familiar with the demands of the test situation.

4. They are equally free of emotional disturbances and anxieties that might interfere with their performance.

5. They are equally free of biological dysfunctions and organic difficulties which might interfere with their test performance.

(Mercer, 1973)

The penalizing nature of standardized tests used with severely and profoundly handicapped persons was emphasized in a study by O'Conner, Justice and Payne, (1970). The authors investigated the expected number, type and effects of physical handicaps on performance of institutionalised retarded persons (n = 17,893), and found (a) the number of handicapping conditions were inversely related to the CA and IQ and (b) 50% to 100% of young, moderately, severely and profoundly retarded persons (CA less than 20 years), can be expected to have speech handicaps. This finding is particularly important when one considers that the Stanford-Binet, which requires many verbal/language skills, was rated the best single test for severely retarded persons (Johnson and Capobianco, 1957) and has been reported as the most widely used test within state institutions for mentally retarded persons (Silverstein, 1963). Furthermore, Zelazo (1979) has pointed out that an examination of specific items on the traditional tests reflects three main categories: measures of gross and fine motor performance; imitative behaviour that implies the

capacity for gross and fine motor performance; and both language comprehension and production. Zelazo also emphasizes that even speech requires a specific motor facility. For example, cognitively intact children marked with severe neuromotor damage are rendered, in many instances, untestable using measures involving gross motor performance, imitation or speech. If a severely/profoundly handicapped person has expressive communication limitations then it becomes difficult to separate language delay from overall developmental disability. Language delay does not necessarily dictate overall developmental disability (Menyuk, 1979). Nevertheless, Menyuk indicates that it is necessary to assume the position that we can make valid inferences about language competence from measures of language behaviour (performance) and can predict from these measures how a child will function over time in a variety of communicative situations. The degree to which severely and profoundly handicapped persons can communicate effectively with others in the linguistic community seriously affects the course of their social and emotional development as well as being crucial to success in the academic tasks that confront them in the school learning situation, (Menyuk, 1973).

Both Dore (1975) and Bruner (1975) have suggested that early routines of motor and/or vocal behaviour mark the earliest forms of communication sequences, and as such are crucial to the development of general intelligence. Therefore, in order to cater to the special

characteristics of the severely and profoundly handicapped child, assessment/training objectives for communication skills must be adaptable (Yoder and Reichle, 1977). Wilcox (1979) points out that if an objective states that the child should verbally label objects, an alternative may have to be formulated for the non-verbal child. It is also important to more comprehensively evaluate the child's auditory abilities. In light of the critical role of hearing and the high prevalence of hearing impairment among the retarded in general, it would appear that reliable and valid audiological assessment would be of the highest priority in programming for severely and profoundly handicapped persons (Lloyd, 1977).

Zelazo (1979) indicates that the guiding theories of early intellectual development have been unanimous in assuming that intellect is first reflected through motor actions. Developmental theorists (Piaget, 1962; Gessel, 1925; Griffiths, 1954; Bayley, 1969) have for the most part viewed gross and fine motor performance as reflecting genetic structure underlying cognitive ability. However, Crothers and Paine (1957) and Holman and Friedheim (1959) found that severe motoric involvement is not necessarily indicative of mental retardation. Therefore, if an objective states that pupils should perform a specific motor movement, an alternative objective may also have to be formulated for severely motorically impaired children. It is also imperative that alternative instructions and response modes be devised for students who are not only non-verbal, and physically

handicapped, but who may also be hearing impaired.

Robert Glaser may be credited with coining and popularizing the term "criterion-referenced testing". He and his colleagues at Pittsburgh have been involved in developing systems of individually prescribed instruction. Glaser (1976) noted that their work was mainly concerned with testing as a way of finding out whether an individual had mastered an objective or reached a criterion. The notion of criterion-referenced tests had its antecedents in the earlier wave of interest in programmed instruction, which grew out of Skinner's success with reinforcement approaches to behaviour modification. In a sense, programmed instruction is as much 'programmed testing' -- a way of teaching or presenting, what is to be learned, by assessing what is known. The outcome of the test is used to make an instructional decision (Hively and Reynolds, 1975).

Wilcox (1979) pointed out that the advent of criterion-referenced and instructional program based assessment has provided an important bridge between assessment and programming. What is evaluated is student performance on curriculum items. Criterion-referenced measures are designed to assess an individual's status with respect to a particular criterion or standard of performance, regardless of the relationship of a child's performance to the performance of others on the same task, and therefore have no competitive orientation.

By adopting criterion-referenced assessment measures the teacher has a close involvement with both measurement and decision-making.

He/she is compelled to write specific instructional objectives and to evaluate the extent to which these are attained (Neisworth and Smith, 1978).

The curriculum items might be developed from one of two basic approaches: using normal developmental sequences as the basis for assessment and programming, or using an analysis of ultimate functioning to isolate important functional skills. Using either approach, the strategy which serves as a basis for curriculum development also serves as the basis for assessment efforts (Wilcox, 1979). For an effective developmental program, this information needs to be pertinent to skill objectives designed for the individual student -- to point out the strengths and weaknesses of the child's patterns of learning behaviour.

The use of criterion-referenced measures demonstrates an attempt to identify behavioural domains which may sensitively reflect the development of handicapped children. However, the nature of many of the behaviours which impede learning are unique to the severely and profoundly handicapped population. These behaviours present management problems of the kind and degree infrequently encountered in the regular classroom (for example, throwing objects and self-injurious behaviour). Therefore it becomes important to isolate inappropriate behaviours. Check lists can aid the teacher in assessing the extent to which negative inappropriate behaviours interfere with on-task performance.

Simeonsson, Huntington and Parse (1979) emphasize the need to move away from the dependence upon a single variable e.g. intelligence, to document developmental changes of handicapped children, towards the inclusion of several variables or types of data. Some criterion-referenced measures attempt to reflect this approach by incorporating a number of categories which are most likely to reflect adaptive behaviours. According to the American Association on Mental Deficiency (AAMD) manual:

> '. . . Adaptive behaviour is a composite of many aspects of behaviour and a wide range of specific abilities and disabilities. Behaviours which have been subsumed under the designation, intellectual, affective, motivational, social, motor, etc., all contribute to and are a part of total adaptation to the environment. Since the behaviours sampled by the current intelligence will correlate with level of adaptive behaviour.' (Grossman, 1973, p. 19).

Criterion-referenced assessment can be organized into various developmental skills areas. These developmental skill areas include communication skills, pre-academic skills, gross motor skills and socialization/self-help skills. The assessment items within each skill area attempt to comprehensively cover essential areas of child development. Division of assessment into developmental areas demonstrates the pattern of each child's developmental progress, and provides a comprehensive picture of the child's behaviours. Its aim is to foster optimum child development and to identify strengths which may compensate for manifested areas of weakness (Vulpe, 1977). Such an assessment model was employed by the Mailman Center for Child

Development, University of Miami in 1975 when they undertook a three year model center program for 80 severely handicapped children ranging in age from birth through five years (Bricker and Dow, 1980). The project had three major goals, which included determining:

> (a) the feasibility of providing educational services to a population of severely handicapped children and their families.
>
> (b) the essential parameters of an educational intervention program for this population.
>
> (c) the impact of the program, where possible, on child progress.
>
> (Bricker and Dow, 1980)

Child progress was assessed by means of the Uniform Performance Assessment System (UPAS; White, Edgar and Haring, 1978). UPAS produces scores in four different developmental areas namely, communication; gross motor; social/self-help; pre-academic, in order to assess domains of behaviour which are similar to the instructional areas used with the children at the Mailman Center for Child Development. The UPAS scales are built on the hierarchical development of critical skills (e.g. walking, talking, social interaction, etc.).

The UPAS was administered six times from January, 1977 to May, 1978 at approximately three-month intervals. The primary reportable data upon which child progress were measured were pre-post comparisons using UPAS. Results in terms of the impact of the program on child progress, indicated that there was significant

($p < .001$) improvement in each of the four domains i.e. pre-academic; communication; gross motor; social/self-help skills, using UPAS scales.

TEST CONSTRUCTION: ITEM SAMPLING AND SELECTION/EVALUATION

(a) Norm-referenced Testing Framework

The first major task facing the test-designer is the detailed analyses of current texts and course outlines which reflect what is typically being taught in classrooms around the country. Furthermore, the test designer is also required to make an evaluation of future curriculum trends in order to anticipate what content should also be included in the test. Once he has a comprehensive set of content outlines which specify behavioural objectives in each subject and skill area, he is in a position to provide an indication of the percent of test items which should be developed to measure such behaviour objectives. Test items can only be effective if they are the end result of rigorous item sampling procedures. Before each item is selected, test construction experts will review them to be sure that the question does not bias its validity for any particular sub-group of the population. Curriculum specialists will examine questions to check that they measure objectives being taught in the classroom. Decisions are made concerning the directions to the teachers and to the students. Furthermore, all items eventually selected are tried out before being included in the final version of the test. After many questions have been written and edited, they

are assembled into experimental test forms for tryout and subsequent analysis. Selection of test items is made after a good test analysis program. All aspects of a test must be 'tried out' along with the items before final decisions are made. The Test Department, Harcourt Brace Yovanovich, Inc., have developed an item analysis program which seeks to gain information concerning --

(i) the difficulty level of each question, i.e. what % of the group answer the question correctly;

(ii) the discrimination of each question, i.e. how well the question distinguishes between students who score high (within top 27% of sample) and those who score low (within bottom 27% of sample);

(iii) the grade progression in terms of difficulty -- do a higher % of students answer the question correctly at successively higher grades.

Schools selected for participation in the item sampling program are carefully chosen to be representative of the population for whom the test is designed. Other factors such as community size, geographical location, socio-economic status, ability levels represented within the schools are taken into consideration. Teachers fill in questionnaires concerning the appropriateness of test item content to their own classroom, and the length of time items take to complete.

Final item selection is made using general statistical guidelines

such as (a) average difficulty level -- the median difficulty level of the questions in the final test should be .55 for the target grade level, (b) range of difficulty values -- the various questions should range in difficulty from .90 to .20 for pupils in the grade for which the test is intended, (c) item discrimination -- all items in the final form must distinguish between high and low scores, (d) grade progression -- the difficulty level of each question for each grade in which it was tested should indicate an increasingly larger percent correct, grade by grade. Content specifications are again evaluated, and test items which have survived the rigour of analysis and reflect content areas for which the test was devised are retained.

(b) Criterion-referenced Testing Framework

The initial step in the creation of criterion-referenced tests is to define the limits of the 'domain' of behaviours which test items will measure and to which individual performance will be referenced. Second, the test developer is required to compose test items within each behavioural domain which will, (a) make instructional sense to the teachers, (b) will take 'time' limits into account i.e. consider the amount of instructional time it would typically take to get learners to display the behaviour depicted in the domain description, (c) display stimulus homogeneity (do items measure the same behaviours?) and response homogeneity (will individuals respond in a similar manner to the test items?) (Popham, 1975).

From a practical point of view it is very difficult to build

special constraints into a domain or 'skill area' so as to meaningfully limit the set of eligible test items without at the same time trivializing that set of items. Popham (1971) suggests the most practical position is to provide sufficient detail for complete stimulus homogeneity of test items. Moreover, the content on which items are based needs to be clearly specified together with instructions of 'directions to respond' that individuals are to receive i.e. use of terms that specify observable measureable behaviour. Learner responses or response types of behaviours have to be clearly identified with regard to defining acceptable responses.

Popham (1975) states that the evaluation of suitable test items is first of all judged by the suitability of the domain definition. This may be determined by having curriculum specialists (other than item writers or domain developers) judge the degree to which the prepared test items are congruent with the domain definition. Moreover, it is necessary to see whether the apparent homogeneous test items do, in fact, behave comparably. Popham (1971) suggests that in accepting or rejecting items from a domain the same criteria for acceptance or rejection of items for norm-referenced tests be used, namely, items that behave discordantly, that is, are answered correctly by low scorers and are answered incorrectly by high scorers should be modified or eliminated.

Summary

The use of traditional normative measures to provide a

classification of level of functioning of severely/profoundly handicapped persons has proven to be of little help for home programming purposes for the following reasons:

1. Test performance is likely to be jeopardized by handicaps peculiar to severely/profoundly handicapped persons.
2. The 'average' classroom reflected in norm-referenced standardization procedures may differ markedly from the 'special' classroom of the severely/profoundly handicapped person.
3. Tests standardized on groups other than the severely/profoundly handicapped population have little relevance when applied to severely/profoundly handicapped persons.
4. The emphasis of norm-referenced tests on providing an index of a student's relative standing to others has little relevance in a field where defining actual skill competencies is all-important.
5. Most standardized norm-referenced tests do not provide alternative sets of instructions and response modes for students who may be non-verbal and severely/profoundly handicapped.
6. The characteristics of severely/profoundly handicapped persons have generally made it inappropriate to assess them with instruments designed for their chronologically aged peers.

Criterion-referenced measures provide a more appropriate means by which to assess severely/profoundly handicapped persons for the following reasons:

1. Performance may be ascertained in relation to a class of desired behaviours, in terms of actual levels of mastery rather than relative standing to others.
2. Their construction allows for a more useful measure by which to plan teaching objectives which will follow a logical developmental sequence.
3. Criterion-referenced and instructional programs provide an important bridge between programming and assessment. They define what is to be learned by assessing what is known.
4. Criterion-referenced measures demonstrate an attempt to identify behavioural domains which sensitivity reflect the development of handicapped persons.
5. Criterion-referenced measures aim to foster optimum child development by identifying strengths which may compensate for manifested areas of weakness.
6. By describing the pattern of progress of a severely/profoundly handicapped person, criterion-referenced measures provide a comprehensive picture of the student's performance.

The stress on gaining an accurate measure of student performance is an outcome of the dissatisfaction felt towards traditional measures which have in large part been purely diagnostic rather than prescriptive.

CHAPTER III

RATIONALE, ANTICIPATED OUTCOMES

Rationale 1

In order to assist the severely and profoundly handicapped child along the continuum toward normalization, the Resources for the Dependent Handicapped project has sought to provide programming in functional skill areas regarded as crucial for development; these areas include communication, pre-academic, gross-motor, self-help and socialization skills. Within each of these skill areas, skill sequences have been developed by means of a logical analysis of the complexity of the skills (simple skills typically precede more complex skills) on the basis of the order in which they generally occur in normal development. For example, the sequential order of early skills in vision, auditory and motor sequences has been based on the maturation of the nervous system.

Many of the subjects comprising both groups studied in the Resources for the Dependent Handicapped program had received little or no programming prior to entry into the project. The criterion-referenced assessment measures (described in Chapter IV under the heading 'Instrumentation') were employed to assess the impact of the R.D.H. program upon the individuals involved. The various developmental skill areas covered by the criterion-referenced assessment device aided the tester in determining overall gains, if any, that may have occurred as a result of program intervention.

The compounding handicapping conditions in physical, sensory and cognitive areas are problematic in terms of developing appropriate intervention and remediation strategies for severely and profoundly handicapped persons. Moreover types and levels of medication prescribed to control aggressive behaviour characteristics and health problems may also have an impact on alertness and performance. This study does not attempt to define causal relations between drug treatment and performance. However, empirical documentation of medical status and provision of specialist services for subjects involved in the Resources for the Dependent Handicapped project provided a basis for more sensitively accounting for possible variations in performance.

Definitions

Criterion-Referenced Assessment:

The criterion-referenced assessment battery (described in Chapter IV under the heading 'Instrumentation') was designed to provide the tester with a comprehensive record of the existing skills of a severely and profoundly handicapped person. It consisted of five major curricular areas: Receptive/Expressive communication skills, primary/advanced Pre-academic skills, primary/advanced Gross motor skills, Self-Help and Socialization. Items within each of these skill areas were either observed in the natural environment or tested in a structured direct assessment situation, where up to four levels of prompting (verbal or gestural cueing) or guidance (minimum and

maximum hands-on assistance) may have been employed. Following the provision of the instruction or initiating stimulus, if the subject did not respond, the assessor introduced (one after the other) increased amounts of prompting or guidance to determine what additional cues or assistance were necessary to assist the subject in meeting the objective. (For further elaboration see Chapter IV pages 40 to 75).

Program Intervention:

A program of day center activity and group home living, the Resources for the Dependent Handicapped project, described in Chapter IV, was provided for each child.

Treatment Group #1

Subjects who entered the R.D.H. project after Assessment #1 prior to Assessment #2. Therefore Assessment #1 served as a pre-test measure of performance and Assessment #2 and #3 as posttest measures of performance.

Treatment Group #2

Subjects who entered the R.D.H. project after Assessment #2 and prior to Assessment #3. Therefore Assessments #1 and #2 served as pre-test measures of performance and Assessment #3 as a posttest measure of performance.

Anticipated Outcome of Evaluation

Subjects identified as comprising Treatment group #1 i.e. those who received program intervention after Assessment #1, will be

expected to exhibits gains in performance in each of the developmental skill areas. Subjects comprising Treatment Group #2 will not be expected to demonstrate significant gains in performance until the implementation of program intervention after Assessment #2.

All subjects comprising both Treatment groups may demonstrate a decrease in levels of medication, and an increase in health status over the total assessment period.

The research hypotheses addressed by this study included the following --

1.1 Treatment Group #1 subjects will be expected to demonstrate significant gains on posttest measures of performance in Receptive/Expressive communication skills, primary/advanced Pre-Academic skills, primary/advanced Gross Motor skills, and Self-Help/Socialization as a result of program intervention after Assessment #1.

1.2 Treatment Group #2 subjects will not be expected to demonstrate significant gains on measures of performance in Receptive/Expressive communication skills, primary/advanced Pre-Academic skills, primary/advanced Gross Motor skills and Self-Help/Socialization on the two pre-tests prior to program intervention.

1.3 Subjects comprising Treatment Group #2 will be expected to demonstrate a significant gains in Receptive/Expressive communication skills, primary/advanced Pre-Academic skills,

primary/advanced Gross Motor skills and Self-Help/Socialization on the posttest measure of performance during program intervention.

1.4 Pre-posttest analysis of health status for all subjects may demonstrate a consistent decrease in use of medication, a consistent increase in health ratings and use of special services at the time of the final assessment.

Rationale 2

It is a second concern of this study to identify skill areas which may be correlated with the child's levels of competency in other skill areas defined by the criterion-referenced assessment device. Dore (1973), Bruner (1975) and Menyuk (1979) have suggested the importance of language as being crucial to success in a variety of social and academic situations. Thus, if a child has limited communication skills, then skills in any way related to communication functions may also be affected. Yoder and Reichle (1977) suggested that all communication is for problem solving purposes. This may be the simple problem of coping with everyday needs, such as signalling the need to go to the toilet, or the more sophisticated need of indicating the desire for further communication. Regardless of the problems faced in everyday life, it would appear that an effective and translatable communication facility is crucial for development. Moreover, any delays in, or absence of, prerequisite communicative responses may lead to limited performance in skill areas such as

academic and socialization skills which are to a large extent dependent upon communication skills.

Anticipated Outcome of Evaluation

This study sought to determine the extent of the relationship between performance in Receptive and Expressive communication skill areas and performance in the Pre-academic/Socialization skill areas for both Treatment groups at the time of Assessment #1 and Assessment #3. This Study also attempted to determine whether program intervention strengthens or weakens the correlation between Receptive and Expressive communication skills, and examined whether age is significantly related to performance in the Receptive/Expressive communication skill areas.

The research hypotheses addressed by this study included the following: --

2.1 Analysis of overall scores may demonstrate a significant correlation between performance in the Receptive/Expressive communication skill areas, and performance in the Pre-academic and Socialization skill areas for subjects comprising both Treatment groups at the time of Assessment #1 (pre-test measure of performance) and Assessment #3 (posttest measure of performance).

2.2 There would be a significant correlation between performance in the Receptive communication skills area and performance in the Expressive communication skills area for subjects comprising

both Treatment groups at the time of each assessment.

2.3 There would be a significant correlation between chronological age of subjects and performance in the Receptive/Expressive communication skill areas.

Rationale 3

As was indicated for the communication skill areas, it can be argued that the child's motor skills may be related to other functioning areas, such as the child's ability to interact appropriately with those in his environment. The assumption that a child's intelligence is directly and necessarily linked to sensory-motor development has served as the foundation for many traditional tests and theories regarding the general level of intelligence. However, this study did not seek to determine whether intelligence was necessarily linked to Gross motor performance. Rather, this study attempted to examine whether a significant correlation existed between Gross motor performance, and performance in skill areas such as Pre-academic and Self-Help skills, which to a large extent require some degree of ability in Gross motor skills.

Bijou (1966) in identifying the ways in which retarded development occurs, has suggested that response functions are altered when the individual lacks the structural capability (e.g. severe spastic quadriplegic) to respond. Abnormal anatomical structure affects both stimulus and response functions so that the individual may lack the necessary mechanisms to seek out and/or reach stimuli.

If it can be shown that a significant correlation exists between Gross motor performance and performance in other skill areas such as Pre-academic and Socialization skills, then alternative response modes (e.g. prosthetic devices) may need to be devised for severely motorically impaired subjects who demonstrate low levels of functioning in skill areas which are extensively related to Gross motor performance.

Anticipated Outcome of Evaluation

This study attempted to examine the relationship existing between performance and the primary/advanced Gross motor skill areas and performance in Pre-academic and Self-Help skill areas for subjects comprising both Treatment groups at the time of Assessment #1 and Assessment #3. This study also sought to determine whether program intervention strengthened or weakened the relationship between performance in primary and advanced Gross motor skills. Finally, this study examined whether age is significantly related to Gross motor performance.

The research hypotheses addressed by this study included the following: -

3.1 Analysis of overall scores may demonstrate a significant correlation between performance in the primary/advanced Gross motor skill areas and performance in the Pre-academic and Self-Help skill areas for subjects comprising Treatment Group #1 and Treatment Group #2 at the time of Assessment #1 (pre-test

measure of performance) and Assessment #3 (posttest measure of performance).

3.2 There may be a significant correlation between performance in the primary Gross motor skills area and performance in the advanced Gross motor skills area for subjects comprising both Treatment Group #1 and Treatment Group #2 at the time of each assessment.

3.3 There may be a significant correlation between chronological age of subjects and performance in the primary/advanced Gross motor skill area.

CHAPTER IV

METHOD

Subjects

The subjects entered the Resources for the Dependent Handicapped project from various residential and program placements and facilities. The breakdown of students' previous residential locations is provided in Table 1. Of the 61 subjects originally identified for entry into the project, 16 subjects were involved in the project for some months prior to Assessment #1. Assessment scores for these subjects were not included as part of the Study. Twenty three subjects identified as Treatment Group #1 did not become involved in the R.D.H. project until after Assessment #1. Therefore, Assessment #1 serves as a pre-test measure of performance and Assessments #2 and #3 served as posttest measures of performance. A further 23 subjects identified as Treatment Group #2 did not become involved in the R.D.H. project until after the time of Assessment #2. Therefore Assessments #1 and #2 served as pre-test measures of performance and Assessment #3 served as a posttest measure of performance (See Table 2).

Selection of Subjects to Treatment Group

Subjects were not randomly assigned to either treatment groups. Therefore a t-test for the significance of the difference between mean scores of subjects comprising both Treatment groups (Ferguson, 1976, pp. 164-166) was carried out to obtain an estimate of the

TABLE 1

PRE-PLACEMENT RESIDENCE

Pre-residence	Treatment Group #1	Treatment Group #2	Total
Community Home	4	5	9
Eric Cormack Centre	5	6	11
Michener Centre	0	0	0
Wetaskiwin Centre	0	0	0
Rosecrest	7	3	10
Sherwood Park Nursing Home	6	0	6
Baker Centre	0	7	7
Glenrose	1	0	1
No Data	0	2	2
TOTAL	23	23	46

TABLE 2

IMPLEMENTATION OF R.D.H. PROGRAM

	Treatment Group #1	n	Treatment Group #2	n
Assessment #1	No Program	23	No Program	23
Assessment #2	Program	23	Program	20
Assessment #3	Program	23	Program	12

similarity in age (See Table 3 and 5) and performance prior to program entry. The group scores in each these skill areas defined by the criterion-referenced assessment device were then compared at the time of Assessment #1, prior to program intervention. Results of the t-test (See Table 3) obtained from the subjects' scores (0-5) on each item of the test, demonstrated no significant difference between Treatment group #1 and Treatment group #2 on any of the measures. However, in terms of medical status, subjects comprising Treatment group #1 and Treatment group #2 were not equivalent at the time of Assessments #1 and #2.

The number of subjects comprising Treatment group #2 diminished considerably between the first and final assessment. For both health and mobility reasons three subjects were excluded from the project after Assessment #1, and eight subjects were excluded from the project after Assessment #2. The subjects who remained (n = 12) received programming between Assessment #2 and Assessment #3, which served as a posttest measure of performance. Thus, results of the performance of subjects comprising Treatment group #2 were somewhat confusing, due to the fewer number of subjects at the time of each assessment. Therefore, pre-test effects (Assessment #1 and #2) were determined by an examination of the overall performance of subjects remaining at the time of Assessment #2 (n = 20). Pre-post effects were determined by examining the overall performance of subjects remaining at the time of Assessment #3 (n = 12).

TABLE 3

ASSESSMENT #1 RESULTS FOR TREATMENT #1 AND TREATMENT GROUP #2 SUBJECTS

Skill Areas	Treatment Group #1 n = 23 X	Sd	Treatment Group #2 n = 23 X	Sd	Significance
COMMUNICATION					
Receptive	54.22	63.11	55.82	59.31	NS
Expressive	26.61	26.61	29.00	36.10	NS
PRE-ACADEMIC					
Primary	36.26	40.84	38.43	36.15	NS
Advanced	12.26	21.58	10.57	26.55	NS
MOTOR					
Primary	55.78	21.58	68.26	26.55	NS
Advanced	8.65	18.59	14.39	34.17	NS
SELF-HELP	36.65	23.15	23.15	35.88	NS
SOCIALIZATION	26.96	21.73	29.13	24.48	NS

In this study 48 percent (n = 22) of the subjects were in no program whatsoever prior to initiation of the R.D.H. project, while 52 percent were in some type of day program. There is little doubt that these day programs were beneficial for those subjects involved. However, it was felt that the R.D.H. project would prove to be even more beneficial, due to its inclusion of both day and group home components, together with the assumption that the R.D.H. project was more appropriate for persons with severe/profound handicapping conditions. Moreover, 48 percent of the subjects are now involved in a service program not available up until the time of R.D.H. project initiation.

Assessment Procedures

A breakdown of the number of subjects in Treatment group #1 and Treatment group #2 at the time of each assessment is presented in Table 4. The guideline of at least four months (and typically five or six months) involvement in the R.D.H. project was required prior to the initiation of Assessments #2 and #3 for Treatment group #1 subjects, and Assessment #3 for Treatment group #2 subjects. This procedure attempted to allow for program effects in terms of subject's newly acquired skills and knowledge.

General Description of the Subjects

A general description of the subjects' attributes for each group at the time of Assessment #1 is presented. Physical characteristics of the subjects are also described at this time.

TABLE 4

NUMBER OF SUBJECTS FOR EACH GROUP

	Assessment #1	Assessment #2	Assessment #3
Treatment Group #1	23	23	23
Treatment Group #2	23	20	12
TOTAL	46	43	35

The subjects' mean ages, standard deviation, range and number at the time of Assessment #1 are shown in Table 5, for each group. As can be seen from the Table, groups were similar on this variable. A description of the sex of the subjects for each group is shown in Table 6. This finding is at variance with research of other categories of disabilities which has generally found a larger number of males (Levine, Elzey and Fiske-Rollin, 1979).

Physical Characteristics

The subjects' physical characteristics were typical of a very severely handicapped group. An overview of the degree of mobility for the entire sample prior to Assessment #1 is seen in Table 7, as well as a breakdown by group. As can be seen in the table, for the total sample only 6.5 percent were able to walk unsupported (n = 3) while 11 percent walked with some support (n = 5); 59 percent (n = 27) exhibited no mobility whatever. In terms of sensory acuity, 20 percent (n = 9) of all subjects were judged to have significant visual impairment whereas no data was available on the incidence of auditory disorders. Also no data was available regarding less severe visual impairment. This percent of visually handicapped individuals certainly exceeds the incidence in the normal population for blind and partially sighted persons which is thought to be .23 percent (Telford and Sawrey, 1977). Thus, sensory handicaps certainly represented a major problem, particularly given the lack of adequate data regarding mild visual impairment of any degree, and the absence

TABLE 5

MEAN AGE, STANDARD DEVIATION, RANGE AND NUMBER FOR EACH GROUP

	ASSESSMENT #1			
	Mean Age	Standard Deviation	Range	n
Treatment Group #1	12.7	5.4	5-21	23
Treatment Group #2	12.2	5.1	5-22	23

TABLE 6

SEX OF SUBJECT FOR EACH GROUP

	Male	Female	n
Treatment Group #1	9	14	23
Treatment Group #2	12	11	23

TABLE 7

MOBILITY OF SUBJECTS FOR EACH GROUP

	Assessment #1	Walks Unsupported	Walks Supported	Crawls	Creeps	No Mobility	Total
Treatment Group #1	(n = 23)	2	3	7	2	9	23
Treatment Group #2	(n = 23)	1	2	1	1	18	23
TOTAL	(n = 46)	3	5	8	3	27	46

of information regarding auditory impairment. The compounding handicapping conditions in physical and sensory areas were problematic in terms of developing appropriate intervention and remediation strategies.

The data shown in Table 8 presents the number of subjects from the total sample taking medication during the six month period prior to Assessment #1. Fifty percent (n = 23) of the subjects were taking anticonvulsant medicine. Thus, a large number of the subjects were considered to be experiencing seizure disorders requiring long term medication. In addition, 65 percent of the subjects (n = 30) were taking antibiotics presumably to combat bacterial infection. At the same time, 54 percent (n = 25) of the subjects were prescribed tranquilizers as needed. [illegible]eed a cross tabulation of these medications indicated that 37 percent of the subjects were receiving both antibiotics and anticonvulsants; 41 perce[illegible] were receiving antibiotics and tranquilizers; and 26 percent were receiving anticonvulsants and tranquilizers. A significant percentage of the total sample (34 percent) were being given two or three types of medication upon initiation of the R.D.H. project.

Medical Status of the Subjects

At this point, a review of health status for all subjects prior to Assessment #1 will be presented. Data for this segment of the study was obtained from the medical form (See Appendix 1) compiled by the nursing staff of the R.D.H. project. The nurses were requested

TABLE 8

MEDICATION FOR THE TOTAL SAMPLE AT THE TIME OF ASSESSMENT #1

	Antibiotics	Anticonvulsants	Tranquilizers
No	11	20	19
Yes	30	23	25
No Data	5	3	2
TOTAL	46	46	46

to provide a general health rating for each subject based upon personal observation and information derived from the medical form. This general health rating was made for each subject within two weeks of the assessment period using a scale from stable to unstable through five levels including stable, moderate, fair, poor and unstable. The general health ratings for each group are described in Table 9.

In terms of various general health indicators, Table 10 provides an overview of the nurses' ratings for each group in terms of frequency of fevers, colds and days absent from the program due to illness. This table indicates the number of subjects in each group who had one of these illnesses or were absent; as well, the mean number of occurrences or days absent are presented along with the frequencies. Results indicate that Treatment group #1 subjects experienced more sickness at the time of Assessment #1.

Special services were obtainable for subjects through normative service delivery systems based in the communities. The R.D.H. project was designed to make available to the dependent handicapped person these services from community resources such as physiotherapy and orthotics. It is quite evident that at the time of Assessment #1 these services were not available to the majority of the subjects, prior to R.D.H. involvement (See Table 11). The number of subjects making medical visits as well as the frequency of the visits at the time of Assessment #1 can be seen in Table 11 as well.

TABLE 9

HEALTH STATUS RATINGS FOR EACH GROUP AT THE TIME OF ASSESSMENT #1

	Treatment Group #1 n = 23	Treatment Group #2 n = 23
	Assessment #1	Assessment #1
1. Stable	6	13
2. Moderate	12	2
3. Fair	3	2
4. Poor	1	1
5. Unstable	1	0
No data	0	5
Mean	1.95	1.5

TABLE 10

AVERAGE FREQUENCY OF FEVERS, COLDS, DAYS ABSENT

	Treatment Group #1 Assessment #1 n = 23	Treatment Group #2 Assessment #1 n = 23
Fevers = (Frequency/Month)		
Number	15	4
Mean Occurrence	1.2	.21
Colds = (Frequency/Month)		
Number	13	8
Mean Occurrence	0.9	.48
Days Absent = (Frequency/Month)		
Number	11	5
Mean Occurrence	6.4	2.0

TABLE 11

FREQUENCY OF SUBJECTS RECEIVING NORMATIVE AND SPECIALIZED SERVICES

	Treatment Group #1 Assessment #1 n = 23	Treatment Group #2 Assessment #1 n = 23	Totals Assessment #1 n = 46
Physiotherapy	8	3	11
Orthotics	1	1	2
TOTALS	9	4	13
Medical Visits:			
Subjects visiting	14	13	27
Mean number of visits	1.7	1	1.35

Summary

At the time of Assessment #1 the general medical health status of the subjects indicated that their health appeared to be relatively stable. Subject mobility in general was severely delayed or non-existent, with the presence of multiple handicapping conditions. There appeared to be moderate incidents of acute illnesses up until and during initiation of the R.D.H. project with a fairly high level of medication being employed. Special services such as physiotherapy and orthotics were being used by 28 percent of the subjects at the time of Assessment #1.

Instrumentation

The criterion-referenced assessment battery (See Appendix 2 for a copy) used to collect data serving as the dependent variables in this study, was designed to be administered over a long-term period with assessment once every four to six months in order to monitor subject progress. The Uniform Performance Assessment System (White, Edgar and Haring, 1978) served as the basis for initial test development. The Uniform Performance Assessment System (UPAS), developed at the Experimental Education Unit in co-operation with the Department of Special Education at the University of Washington, is a curriculum-referenced instrument for use with a wide range of handicapped children.

The UPAS 0-6 year scale, which formed the basis of the revised criterion-referenced assessment used in this study, covers five major

curricular areas namely, pre-academic/fine motor skills, communication skills, social/self-help skills, gross motor skills and inappropriate behaviours. The 0-6 year level was originally developed to include all the major developmental milestones normally attained during the first six years of life. The items on the UPAS scale are designed to measure the early manifestations of skills which develop, over the course of many years, into functional behaviours which are regarded as crucial to independent living (White, Edgar and Haring, 1978).

The UPAS items have been classified according to the behavior category to which specific skill area is being tested fall. The four broad behaviour categories are sensory intactness or awareness, motor skills, cognitive skills and interactive skills. The sensory intactness or awareness items are tests of hearing and vision, and are designed to probe possible deficits in these areas. The motor items are designed to probe movement limitations. Items are hierarchically ordered from easier to harder skills. Cognitive skills are those which attempt to measure the quality of information processing and synthesis. Interactive skills are those which have both a motor and a cognitive component.

The five major skill areas covered by the revised criterion-referenced device were the same as those of the UPAS, and included communication skills, pre-academic skills, motor skills, self-help skills and socialization skills. Table 12 presents a

TABLE 12
CRITERION REFERENCE TEST CATEGORIES

CATEGORY	SUBCATEGORIES	SEQUENCE
Communication	Receptive (Skills 1-24	
	Expressive (Skills 25-60)	
Pre-Academic	Primary (Skills 1-39)	Visual Perception Reach/Grasp/Release Perceptual Motor Sequencing Writing
	Advanced (Skills 40-61)	Pre-Reading Discrimination Pre-Math Right/Left
Gross Motor	Primary (Skills 1-21)	Early Neuromuscular Development Ball Skills
	Advanced (Skills 22-61)	Rhythm Walking Skills Up/Down Stairs Jumping/Coordination Dynamic Balance Equipment
Self Help	(Skills 1-28)	Feeding Dressing Toileting Washing/Grooming
Socialization	(Skills 1-18)	Adaptive Self-Directed Behaviours Adaptive Interpersonal Behaviours Play
Inappropriate Behaviour Check List	(Unapp. Beh. Chlst. #1-19)	Inappropriate Verbal Behaviour Inappropriate Physical Behaviour

breakdown of the categories and subcategories contained in the criterion-referenced assessment battery. Within each major category, the skills were sequenced into subcategories such as receptive and expressive skills within the communication group. For each category, the data collection sheet listed the skills included in the area and were used by the assessor to keep track of the subject's performance. For each skill in every category, a criterion test item (see Table 13) specified the definition of the skill, the assessment procedures and materials, and the exact scoring guidelines. In addition, the Inappropriate Behaviour Check List (See Appendix 3) which was adapted directly from the UPAS, defined 19 inappropriate verbal and physical behaviours which may interfere with the assessment process if the subject exhibits one or more of them to a significant degree (White, Edgar and Haring, 1978).

Several guidelines were employed by the assessors when administering the test. Data was collected about the subjects in both the natural setting as well as in a structured assessment situation. In the natural setting, the assessor observed for the presence or absence of a specific skill and scored the subject on this skill once. On this occasion, the subject received a score of 5 or 0: 5 indicated that the objective specified on the criterion test was met at the time, whereas a score of 0 indicated that the subject did not exhibit the behaviour or skill during the time of the observation.

TABLE 13

SAMPLE CRITERION TEST ITEM

Skill 10

Ages: 8-9 mo. Category: Pre-Academic Recording: Prompt

I. Skill Description

The subject puts a cube into a container.

II. Equipment and Materials

1. Sand pail or 1 pound coffee can.
2. Two cubes
3. Record sheet.

III. Test/Observation Procedure

1. Rater gives the subject a cube and holds the container upright.
2. Rater uses levels of prompting.
3. Rater repeats for three trials.

IV. Criteria for 5

The subject places the cube in the container.

V. Criteria for 0

The subject does not succeed in putting the cube back into the container.

VI. Instructions

Level 5 - "Put in"

4 - "Put the block in"

3 - Gesture

2 - Minimum guidance to subject's wrist

1 - Maximum guidance to subject's hand

For a large percentage of the items, the objective for each skill was assessed in a structured direct assessment situation with the subject and the rater; each of the skills assessed in this manner was tested three times to obtain a measure of stability in the child's performance level on the assessment device. For some items assessed in the structured situation, all three trials employed the format specified in the criterion test and included the use of various levels of prompting and guidance. For other items on the skill sequence (indicated by a circled skill number on the test form) two of the three trials were observed spontaneously to obtain the score. Only one of the trials, then, would be scored in the structured test situation using the levels of prompting and guidance. The exception to this rule was for self-help and motor skill items which could be scored through spontaneous observation for all three trials.

For the items assessed through a structured testing situation, up to four levels of prompting (verbal or gestural cueing) or guidance (minimum and maximum hands-on assistance) could be employed (Kysela et al, 1981). Following the provision of the instruction or initiating stimulus, if the subject did not respond, the assessor introduced (one after the other) increasing amounts of prompting or guidance to determine what additional cues or assistance were necessary to assist the subject in meeting the objective. A description of each level of prompting and guidance is presented in Table 14. In addition, Table 15 portrays the definitions of each

TABLE 14

ASSESSMENT PROCEDURE FOR THE INTRODUCTION OF THE LEVELS OF PROMPTING AND GUIDANCE

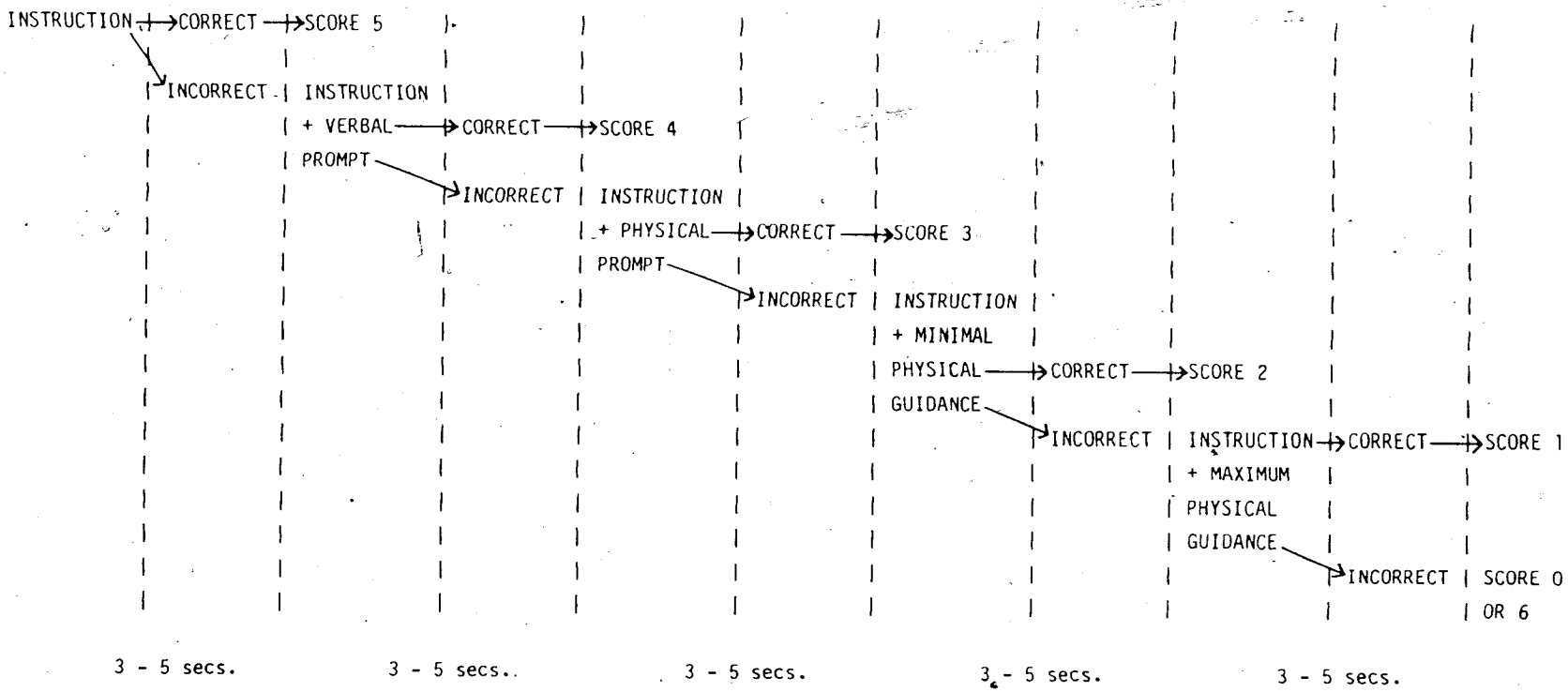


TABLE 15

DEFINITION OF LEVELS OF PROMPTING AND GUIDANCE AND THE ADDITIONAL SCORES EMPLOYED ON THE CRITERION REFERENCED TEST

	Score
Level 5 - Skill is performed following instruction or initiating stimulus without additional cues.	5
Level 4 - Skill is performed following instruction and one or two verbal prompts when no response occurred at Level 5. Verbal prompts are repeated instructions or additional verbal comments intended to initiate resonding or focus attention relevant material or cues.	4
Level 3 - Skill is performed after instruction and use of one or two physical prompts or a model of the appropriate act; this response follows failure on Level 4. Physical prompts include gestures or motions by the assessor directing the subject's attention. Model is demonstration of desired resonse by the assessor. No physical contact is made up to this level.	3
Level 2 - Skill is performed after instruction and minimum physical guidance following failure at Level 3. Minimum physical guidance is assisting the subject to respond with one finger for a maximum of 3-5 seconds.	2
Level 1 - Skill is performed after instruction and maximum guidance following a lack of response at Level 2. Maximum physical guidance includes any hands-on assistance greater than that used at Level 2 with one finger. Maximum guidance could last from 3-5 seconds with the subject.	1
Level 0 - Skill is not performed after attempt at Level 1 is made for 3-5 seconds. This score includes instances when the subject throws equipment or is non-compliant during the assessment e.g. has a tantrum or resists the guidance.	0
- Subject was not attending, being led through skill passively or no response even after guidance.	6*
- No equipment was available to assess the skill.	7*
- Skill was not performed by the subject due to physical disability, e.g. motoric problems, blind, deaf.	8*
- Skill not tested by the assessor there was no opportunity to observe a particular skill.	9*

*These scores are counted as 0 when calculating the sum for a specific area or sub-area of the test. The scores of 7, 8, and 9 are deleted when computing percentages.

level of prompting and guidance as well as the score noted by the assessor for an item passed at each level. Table 15 also shows the additional scores used for untested items. These scores obtained from the data sheets were then entered into the computer and item analysis as well as summaries of areas of performance were obtained from the data files.

With respect to the completion of an assessment for a subject, three situations would result in the termination of the assessment session. If the subject did not have the pre-requisite skill to complete further skills, testing stopped in that area, e.g. subject without grasp would not be assessed on pegs in a pegboard. Second, if a subject scored 0 on the first skill on a sequence in which following skills were more difficult, the assessor stopped in that sequence. Third, the assessor stopped if difficulties in assessing a skill arose due to physical impairments or inappropriate equipment.

In terms of by-passing certain skills, if the subject was currently functioning at a higher level beyond skills tested at an earlier level in the sequence, the assumption was made that the subject would complete the simple objective and the skill was scored as a 5. For example, for a subject who was walking well, crawling would not be tested and the subject would receive a score of 5 for the crawling item.

The administration of the assessment battery thus yielded total scores for each of the sub-areas involved by addition of each items'

scores with six, seven, eight and nine counted as 0. The range of these scores for each area of assessment is shown in Table 16. Scoring procedures were adapted as follows. For the Receptive communication skills area, a total of 48 test items were presented. Given a maximum of five points for the successful completion of each item, a total of 240 points would be obtained in this area. For the Expressive communication skills area, a total of 40 test items were presented. Therefore a maximum of 200 points could be obtained. For the primary Pre-academic skills area, a total of 48 items were presented giving a maximum score of 240 points. For the advanced Pre-academic skills area, a total of 56 test items were presented. Therefore, a maximum of 280 points could be obtained. In assessing primary Gross motor skills a total of 27 items were presented, giving a maximum possible score of 135 points. In assessing advanced Gross motor skills, 46 test items were presented, giving a maximum possible score of 230 points. For the Self-Help skills area, a total of 37 test items were presented. Therefore, a maximum of 185 points could be obtained. Finally, in the Socialization skills area, 29 test items were presented, giving a maximum possible score of 145 points. Thus, for any particular subject there was a total score for each one of the areas on the assessment device; this sum was used in calculating the statistics (mean, median, range) for each area of functioning assessed.

The wide ranging variation between test scores and within test

TABLE 16

RANGE OF SCORES FOR CRITERION REFERENCED ASSESSMENT

Communication	
Receptive Skills	0 - 240
Expressive Skills	0 - 200
Pre-Academic Skills	
Primary Level	0 - 240
Advanced Level	0 - 280
Motor Skills	
Primary Level	0 - 135
Advanced Skills	0 - 230
Self-Help Skills	0 - 185
Socialization	0 - 145

scores for each group at the time of each assessment made it inappropriate for a parametric analysis of variance (such as an F test, or a t-test) to be used to determine whether gains, if any, were significant over the total assessment period. Therefore, it was decided to employ a test whose procedures only make minimal assumptions about the form of the underlying distribution. One such non-parametric test is the Friedman two-way analysis of variance by ranks (Ferguson, 1967, pp. 395-396) which tests the null hypothesis that the K samples (test scores) have been drawn from the same population.

In order to examine subject progress employing the Friedman two-way analysis of variance by ranks, raw scores for each sub-test at the time of each assessment were re-assigned a pass/fail rating. Scores 5, 4, 3, 2 for each sub-test item were assigned 1 = Pass; scores of 1, 0, 6 were assigned 0 = Fail; scores of 7, 8, 9 (indicating items considered non-testable, or untested) were not included in the pass/fail ratings. With the Friedman test, chi-square, degrees of freedom and significance level were obtained for the number of items tested, the number of tested items passed, and ratio of items passed to items tested, for each sub-test at the time of each assessment (See Appendix 4) for both Treatment groups in order to test the research questions.

The Independent Variable: Resources for the Dependent Handicapped Project

The independent variable in this study was the inclusion of a subject into the Resources for the Dependent Handicapped project. Project day centers were located in a number of Edmonton Public Schools, where individual programming was planned and implemented for each subject involved in the project. Curriculum objectives -- as outlined in the Dependent Handicapped Curriculum Guide (Alberta Education, 1981) were based upon age-relevant activities. For each skill sequence, within each of the skill areas, progressed from simple to complex skills. The curriculum emphasized functional skills, i.e. those fundamental to successful daily living, as a means of preparing the dependent handicapped person to function as independently as possible in school, as home, and in the large community.

Assessment Training Procedures

During training, raters received extensive instruction concerning the measuring and coding of behaviors observed in the field assessment situation. Initially the trainee rater was helped by one of a number of experienced raters (who had continuously participated in the project over a period of 2 years) in order to familiarize him/her with the range of equipment used in the assessment situation, including the format and recording of data on the criterion-referenced assessment sheets. Training in observing and

recording behaviours was first begun by means of viewing previously recorded assessment sessions. At this stage, the trainee rater was always accompanied by an experienced rater who explained each taped assessment sequence and provided extensive feedback. Following this, the trainee rater spent up to 10 hours alone, watching recorded assessments in each of the skill areas defined by the criterion-referenced assessment device in order to gain a thorough knowledge of correct assessment procedures, e.g. levels of prompting. Finally, the trainee rater accompanied an experienced rater to one of the day centers. Making himself as unobtrusive as possible, i.e. making sure not to interact with any of the subjects -- especially the person being assessed; the trainee observer then recorded data on the criterion-referenced assessment sheets, based on the results of the assessment being carried out by the experienced rater. The reliability coefficient was then calculated by means of establishing the percentage of agreement or disagreement between the two raters. The number of agreements were totaled and divided by the number of agreements plus disagreements to obtain the percentage of agreement. When the percentage agreement was regularly established at above 70%, roles were then reversed. The trainee rater carried out the assessment independently, whilst the other rater unobtrusively observed. If inter-rater reliability was regularly established at over 70%, the trainee rater was regarded as sufficiently competent to continue doing assessments independently.

Random reliability checks were carried out by the person in charge of the R.D.H. assessment program. Also on occasion, assessments were carried out with two raters who jointly recorded data for a whole assessment period (1-1/2 - 2 hours). Percentage agreements and disagreements were then calculated for the given reliability session.

Design Consideration

A pretest-posttest Control group design (Campbell and Stanley, 1966, p. 13) was used to determine the effectiveness of the R.D.H. project upon Treatment groups #1 subjects as compared to Treatment group #2 subjects. The project must be regarded as quasi-experimental rather than experimental, as there was no control over selection of subjects to either treatment groups. Subjects were assigned to either group according to the time at which they were accepted for entry into the program. However, the t-test carried out to obtain an estimate of the similarity of performance between the two groups prior to program entry, revealed no significant differences on any of the assessment measures.

Internal and External Validity

Relevant to internal validity, eight different classes of extraneous variables may conceivably threaten the relevance of these findings. These include history, maturation, testing, instrumentation, statistical regression, experimental mortality, change in experimental unit composition, and biases resulting in differential selection of subjects for Treatment group #2

(Kratochwill, 1978, p. 14; Campbell and Stanley, 1966, p. 5).

Historical confounding was a threat to this study. The R.D.H. project, serving as the independent variable incorporated both residential and day center components. The R.D.H. assessment program was concerned with measuring general intervention effects in each of the defined skill areas, whilst being unable to specify under what conditions change occurred. Confounding arising from maturation may have threatened the significance of these findings. The effects of maturation were controlled to the extent that the two Treatment groups were equivalent in terms of age and sex. However, the Treatment groups were not equivalent in other factors affecting maturation, namely, medical status. Moreover, subjects were not assigned to Treatment groups in a random manner, but rather on the basis of time of entry to the R.D.H. project. The effect of testing should have proven negligible due to the 3 - 4 months time interval between each assessment. Moreover, due to their severe and profound handicapping conditions it is unlikely that any of the subjects would demonstrate improved scores based purely on their experience and recall of a prior assessment. The threat to internal validity posed by instrumentation weakens the significance of the findings of this study. There was a scarcity of tester reliability data. Inter-rater reliability checks were only carried out with any degree of consistency within the comunication skills and pre-academic skill areas. In these areas mean agreement between raters was high

(communication skills, 84 percent; pre-academic skills, 92.2 percent). Instrumentation was to some degree controlled by strict training procedures (see Methodology chapter under the title Assessment Training Procedures). Subjects were not selected for the R.D.H. project on the basis of high or low pre-test scores, but rather on the grounds of health and mobility. Any threat to the internal validity of this study due to statistical regression effects i.e. where groups have been selected on the basis of their extreme scores, was unavoidable given the particular design considerations of this study. Pre-test [illegible] revealed no significant differences [illegible] the Treatment groups on any of the assessment measures. [illegible] experimental mortality, change in experimental unit [illegible] sition, and biases resulting in differential selection of subjects for Treatment group #2, all to some extent, threatened the internal validity of this study. For Treatment group #2, there was a radical change in group composition between the time of the first pre-test (n = 23) and the second posttest (n = 12). Thus, it is possible that posttest gains for this group may have occurred more as a result of the selective exclusion of subjects who exhibited particularly poor health or mobility. In consequence, claims made for the R.D.H. project as a result of improved performance of Treatment group #1 subjects as compared to Treatment group #2 subjects, are open to question. According to Kratochwill (1978, p. 21) external validity poses the question of generalizability ability

of results, i.e. the extent to which one can generalize from the sample of an accessible population like those observed. Factors to be considered in estimating external validity of this study include:

(a) Random selection of sample population from accessible population;

(b) Explicit description of the independent variable;

(c) Hawthorne effects;

(d) Measurement of the dependent variables;

(e) Experimenter effects;

(f) Novelty and disruption effects.

As discussed earlier in Chapter IV, selection of subjects to Treatment groups was not random. Allocation of subjects to experimental groups was based on time of admission of subjects to the R.D.H. project.

This study was unable to provide an explicit description of the independent variable i.e. the R.D.H. project. Specific details of the R.D.H. project such as staff training, teacher/student contact time, conjoint programming between residential and day centers, were outside the parameters of this study. However, invalidity due to the Hawthorne effect was minimal. Subjects were unaware of their participation in the R.D.H. assessment program. Experimenter effects or novelty or disruption effects, were minimized, in that raters carried out assessments in as unobtrusive a manner as possible. Moreover, raters did not practice unusual or novel assessment techniques which might have countered the types of instruction given

during normal programming.

Importantly, subjects involved in the R.D.H. assessment program displayed a range of handicapping conditions common to the larger severely/profoundly handicapped population. However, no attempt was made to randomly and representatively select a sample from this population, as ethical considerations precluded the selection of subjects to experimental groups per se.

CHAPTER V

RESULTS

Inter-rater reliability checks were only carried out with any degree of consistency on specific behavioural responses within the communication skills and pre-academic skills area. The degree of inter-rater reliability was calculated by means of comparing the number of agreements and disagreements on scores (0-5) obtained by two raters, after observing individual responses to specific items comprising each skill sequence within each of the skill areas. In the communication skills areas the mean agreement between raters was 84 percent. In the pre-academic skills area the mean agreement between raters was 92.2 percent. In these skill areas, mean agreement exceeded the established lower limit of 70%.

The results of the experimental investigations were analysed according to the anticipated outcomes expressed in Chapter III. In order to determine results for the relevant questions raised, the Pearson product-moment correlation coefficient (Ferguson, 1976) one way frequency distributions (Nie et al, 1975), joint frequency distribution by means of cross tabulation (Nie et al, 1975) and the Friedman two-way analysis variance test (Nie et al, 1975) were employed.

The Friedman two-way analysis of variance test can only be administered on groups which have an equal sample size at each time of testing. For both Treatment groups, pre-posttest effects, in each

of the skill areas, were determined by first comparing the mean ratio of items passed to items tested at the time of each assessment. Second, comparisons were made between the mean ranks for the ratio of items passed to items tested at the time of each assessment.

For Treatment group #2, pre-posttest effects were only obtained for the 12 subjects remaining at the time of Assessment #3. Also for this group, pre-test effects were determined by employing the Wilcoxon matched pairs signed-ranks test for two correlated samples (Ferguson, 1976) and comparing ratio scores, in order to determine whether there were any significant differences between scores obtained at the time of Assessment #1 and Assessment #2. A sign test for two correlated samples was also used to determine the differences between the medians of the distribution of scores at the time of Assessment #1 and Assessment #2 for the 20 subjects remaining at the time of Assessment #2.

Rationale 1

The research questions to be addressed in this section attempted to assess the impact of the Resources for the Dependent Handicapped project on performance of subjects comprising both Treatment groups in each of the developmental skill areas defined by the criterion-referenced assessment device, and to examine the impact of program intervention on the health status of the subjects involved in the Resources for the Dependent Handicapped project.

Research questions are addressed below as they appeared in Chapter III.

> Research Question 1.1: Treatment group #1 subjects will be expected to demonstrate significant gains on posttest measures of performance in Receptive/Expressive communication skills, primary/advanced Pre-academic skills, primary/advanced Gross motor skills and Self-Help, Socialization skills as a result of program intervention after Assessment #1.

The Friedman two-way analysis of variance test was used to compare the mean ratio of items passed to items tested at the time of each assessment (see Tables 17, 18, 19) and then the rankings of ratio scores, i.e. the number of items passed over number of items tested. (see Tables 20, 21, 22). Raw scores (0-5) had proved to be an unsatisfactory means of comparison due to the large amount of variance between individual scores.

Results showed that in the Receptive Communication skills area, no significant gains in ratio scores were indicated for Treatment group #1 subjects between Assessments #1 and #2 despite program intervention after the first pre-test (see Table 20). In the Expressive Communication skills area, results demonstrated significant ($p < .05$) gains in ratio scores for Treatment group #1 subjects between Assessments #1 and #2 following program intervention (see Table 21).

In the primary Pre-academic and advanced Pre-academic skill areas Treatment group #1 subjects demonstrated significant gains overall ($p < .01$, $p < .001$, respectively) in ratio scores between Assessments

TABLE 17

MEAN RATIO OF ITEMS PASSED/TESTED IN EACH OF THE SKILL AREAS FOR EACH ASSESSMENT

A. RECEPTIVE COMMUNICATION SKILLS

Group	Ass. #1		Ass. #2		Ass. #3		Significance
	X	Sd	X	Sd	X	Sd	
Treatment Group #1	.38	.22	.39	.22	.43	.25	N.S.
Treatment Group #2	.47	.22	.48	.25	.47	.24	N.S.

B. EXPRESSIVE COMMUNICATION SKILLLS

Group	Ass. #1		Ass. #2		Ass. #3		Significance
	X	Sd	X	Sd	X	Sd	
Treatment Group #1	.12	.11	.19	.18	.21	.20	$p < .05$
Treatment Group #2	.12	.07	.11	.08	.17	.10	N.S.

C. PRIMARY PRE-ACADEMIC SKILLS

Group	Ass. #1		Ass. #2		Ass. #3		Significance
	X	Sd	X	Sd	X	Sd	
Treatment Group #1	.25	.16	.31	.17	.37	.19	$p < .01$
Treatment Group #2	.26	.15	.29	.19	.33	.17	N.S.

TABLE 18

MEAN RATIO OF ITEMS PASSED/TESTED IN EACH OF THE SKILL AREAS FOR EACH ASSESSMENT

A. ADVANCED PRE-ACADEMIC SKILLS

Group	Ass. #1		Ass. #2		Ass. #3		Significance
	X	Sd	X	Sd	X	Sd	
Treatment Group #1	.05	.20	.18	.21	.16	.14	$p < .001$
Treatment Group #2	.11	.18	.11	.22	.03	.12	N.S.

B. PRIMARY GROSS MOTOR SKILLS

Group	Ass. #1		Ass. #2		Ass. #3		Significance
	X	Sd	X	Sd	X	Sd	
Treatment Group #1	.51	.20	.68	.20	.65	.24	$p < .001$
Treatment Group #2	.12	.07	.11	.08	.17	.10	N.S.

C. ADVANCED GROSS MOTOR SKILLS

Group	Ass. #1		Ass. #2		Ass. #3		Significance
	X	Sd	X	Sd	X	Sd	
Treatment Group #1	.06	.17	.61	.38	.28	.24	$p < .001$
Treatment Group #2	.01	.03	.09	.22	.07	.25	N.S.

TABLE 19

MEAN RATIO OF ITEMS PASSED/TESTED IN EACH OF THE SKILL AREAS FOR EACH ASSESSMENT

A. SELF-HELP SKILLS

Group	Ass. #1		Ass. #2		Ass. #3		Significance
	X	Sd	X	Sd	X	Sd	
Treatment Group #1	.30	.19	.39	.22	.39	.21	$p < .05$
Treatment Group #2	.00	.13	.01	.01	.01	.05	$p < .05$

B. PRIMARY GROSS MOTOR SKILLS

Group	Ass. #1		Ass. #2		Ass. #3		Significance
	X	Sd	X	Sd	X	Sd	
Treatment Group #1	.31	.19	.38	.24	.41	.24	N.S.
Treatment Group #2	.43	.27	.30	.18	.39	.16	$p < .05$

TABLE 20

MEAN RANKS FOR RATIO OF ITEMS PASSED/TESTED IN EACH OF THE SKILL AREAS FOR EACH ASSESSMENT

A. RECEPTIVE COMMUNICATION SKILLS

Group	Ass. #1	Ass. #2	Ass. #3	Significance
Treatment Group #1	1.70	2.09	2.22	N.S.
Treatment Group #2	2.13	1.79	2.08	N.S.

B. EXPRESSIVE COMMUNICATION SKILLS

Group	Ass. #1	Ass. #2	Ass. #3	Significance
Treatment Group #1	1.50	2.24	2.26	$p < .05$
Treatment Group #2	1.67	1.83	2.50	N.S.

C. PRIMARY PRE-ACADEMIC SKILLS

Group	Ass. #1	Ass. #2	Ass. #3	Significance
Treatment Group #1	1.54	1.98	2.48	$p < .01$
Treatment Group #2	1.75	1.83	2.42	N.S.

* TABLE 17 shows mean ratio of items passed/tested.

TABLE 21

MEAN RANKS FOR RATIO OF ITEMS PASSED/TESTED IN EACH OF THE SKILL AREAS FOR EACH ASSESSMENT

A. ADVANCED PRE-ACADEMIC SKILLS

Group	Ass. #1	Ass. #2	Ass. #3	Significance
Treatment Group #1	1.13	2.39	2.48	$p < .001$
Treatment Group #2	2.13	1.79	1.71	N.S.

B. PRIMARY GROSS MOTOR SKILLS

Group	Ass. #1	Ass. #2	Ass. #3	Significance
Treatment Group #1	1.17	2.43	2.39	$p < .001$
Treatment Group #2	1.88	2.04	2.08	N.S.

C. ADVANCED GROSS MOTOR SKILLS

Group	Ass. #1	Ass. #2	Ass. #3	Significance
Treatment Group #1	1.00	2.89	3.11	$p < .001$
Treatment Group #2	2.08	1.92	2.00	N.S.

* TABLE 18 shows mean ratio of items passed/tested.

TABLE 22

MEAN RANKS FOR RATIO OF ITEMS PASSED/TESTED IN EACH OF THE SKILL AREAS FOR EACH ASSESSMENT

A. SELF-HELP SKILLS

Group	Ass. #1	Ass. #2	Ass. #3	Significance
Treatment Group #1	1.50	2.20	2.30	$p < .05$
Treatment Group #2	1.58	1.83	2.58	$p < .05$

B. SOCIALIZATION SKILLS

Group	Ass. #1	Ass. #2	Ass. #3	Significance
Treatment Group #1	1.67	2.09	2.24	N.S.
Treatment Group #2	2.17	1.42	2.42	$p < .05$

* TABLE 19 shows mean ratio of items passed/tested.

#1, #2, and #3 following program intervention. (See Tables 20 and 21).

In the primary Gross motor and advanced Gross motor skill areas Treatment group #1 subjects again demonstrated significant overall gains ($p < .001$ respectively) in ratio scores between Assessments #1, #2, and #3 following program intervention. (See Table 21).

In the Self-Help skills area Treatment group #1 subjects demonstrated significant ($p < .05$) gains in ratio scores between Assessments #1, #2, and #3 following program intervention. (See Table 22).

In the Socialization skills area Treatment group #1 subjects did not demonstrate significant gains in ratio scores over the total assessment period, despite program intervention after the first pre-test. (See Table 22).

Thus subjects comprising Treatment group #1 demonstrated significant gain in ratio scores as a result of program intervention in each of the skill areas, except for Receptive communication and Socialization skills, at the .05 level or higher.

> Research Question 1.2: Treatment group #2 subjects will not be expected to demonstrate significant gains on measures of performance in Receptive/Expressive communication skills, primary/advanced Pre-academic skills, primary/advanced Gross motor skills, Self-Help/Socialization skills on the two pre-tests prior to program intervention.

A sign test for two correlated samples, and the Wilcoxon matched pairs signed-ranks test for two correlated samples revealed that in

the Receptive and Expressive communication skill areas, there were no significant differences in either the medians or ratio scores between the two pre-tests prior to program intervention for Treatment group #2 subjects (n = 20).

In the primary Pre-academic skills area there were no differences in either the medians or the ratio scores for Treatment group #2 subjects (n = 20) between the two pre-tests prior to program intervention. In the advanced Pre-academic skills area there were significant differences in the medians and ratio scores ($p < .01$ respectively) between the two pre-tests prior to program intervention. However, these differences were the result of a decrease in ratio scores at the time of Assessment #2 for Treatment group #2 subjects (n = 20) when compared to Assessment #1.

In the primary Gross motor skills area, there were no significant differences in the medians or ratio scores for Treatment group #2 subjects (n = 20) between the two pre-tests prior to program intervention. In the advanced Gross motor skills area there were significant differences in the medians and ratio scores for Treatment group #2 subjects (n = 20) between the two pre-tests prior to program intervention ($p < .01$, $p < .001$ respectively). However, these differences were the result of a decrease in ratio scores at the time of Assessment #2 when compared to Assessment #1.

In the Self-Help and Socialization skills area there were no significant differences in either the medians or ratio scores for

Treatment group #2 subjects (n = 20) between the two pre-tests prior to program intervention.

Overall results for Treatment group #2 subjects (n = 20) on pre-test measures indicate that in each of the skill areas there were no significant positive gains between the first two assessment periods.

> Research Question 1.3: Subjects comprising Treatment group #2 will be expected to demonstrate significant gains in Receptive/Expressive communication skills, primary/advanced Pre-academic skills, primary/advanced Gross motor skills area, and Self-Help/Socialization skills on the posttest measure of performance following program intervention.

Pre-posttest results (see Tables 20, 21, 22) for Treatment group #2 subjects (n = 12) remaining at the time of Assessment #3 indicated that there were no significant gains in ratio scores for Receptive/Expressive communication skills, primary/advanced Pre-academic skills, and primary/advanced Gross motor skills following program intervention. However, in the Self-Help and Socialization skill areas, gains in ratio scores were significant ($p < .05$, respectively) over the total assessment period. Post hoc procedures employing pairwise comparisons (Marascuilo and McSweeney, 1967) demonstrated that the significant gains in both of these skill areas were registered between Assessments #2 and #3, indicating that by the time of Assessment #3 program intervention may have been exerting a modest effect.

Overall results for Treatment group #2 subjects (n = 12) on posttest measures indicated that program intervention effects were most positive in the Self-Help and Socialization skill areas, in contrast to the other skill areas where no significant gains were registered despite program intervention after the second pre-test.

> Research Question 1.4: Posttest analysis of health status for all subjects will demonstrate a consistent decrease in use of medication; a consistent increase in health ratings and use of special and community services at the time of the final assessment.

An overview of the degree of mobility for the entire sample across each of the assessments can be seen in Table 23, as well as a breakdown by group. As can be seen in the Table, for Treatment group #1 8.7 percent (n = 2) of the subjects were able to walk unsupported at the time of Assessment #1; 8.7 percent (n = 2) were able to walk with some support; 60 percent (n = 14) exhibited no mobility whatsoever, although several of the subjects did exhibit other forms of mobility such as creeping or crawling. At the time of Assessment #3 for Treatment group #1 8.7 percent (n = 2) were able to walk unsupported, and 13 percent (n = 3) were able to walk with some support; 39 percent (n = 9) exhibited other forms of mobility (creeping, crawling) and 39 percent (n = 9) exhibited mobility. For Treatment group #2 4.3 percent (n = 1) of the subjects was able to walk unsupported at the time of Assessment #1, 8.7 percent (n = 2) were able to walk with some support; 78 percent (n = 18) exhibited no mobility whatsoever. At the time of Assessment #3 of those remaining

TABLE 23

MOBILITY OF SUBJECTS, FOR EACH GROUP FOR ASSESSMENT #1 AND ASSESSMENT #3

	Treatment Group #1		Treatment Group #2	
	Ass. #1 n = 23	Ass. #3 n = 23	Ass. #1 n = 23	Ass. #3 n = 23
Walks Unsupported	2	3	1	1
Walks Supported	2	3	2	1
Crawls	3	9	1	1
Creeps	2	2	1	4
No Mobility	14	9	18	5
No Data	0	0	0	0
Total Number	23	23	23	23

(n = 12) one subject was able to walk unsupported, one subject was able to walk with support and 41 percent (n = 5) exhibited no mobility whatsoever.

Table 24 demonstrates that at the time of Assessment #1, 57 percent (n = 13) of the subjects comprising Treatment group #1 were receiving anticonvulsant medication, whereas at the time of the final assessment this number had dropped to 43 percent (n = 10). Data were unavailable for five subjects at the time of Assessment #3. In addition (from Table 24) at the time of Assessment #1, 83 percent (n = 19) of the subjects comprising Treatment group #1 were receiving antibiotic medication presumably to combat bacterial infections. At the same time 57 percent (n = 13) of these subjects were prescribed tranquilizers as needed. In contrast, at the time of the final Assessment #3, the number of subjects receiving antibiotic medication on a regular basis had fallen to 4 percent (n = 2) although data were unavailable for five of the subjects comprising Treatment group #1. The number of subjects receiving tranquilizers on a daily basis had dropped from 57 percent to 30 percent (n = 7) and the number of subjects receiving tranquilizers overall had dropped from 13 percent (n = 3) to 9 percent (n = 2). Data were unavailable for one subject comprising Treatment group #1 at the time of Assessment #3. A cross tabulation of the number of Treatment group #1 subjects receiving two or three types of medication at the time of Assessment #1 was compared with a cross tabulation based on the same variables at the

TABLE 24

MEDICATION FOR EACH GROUP,
ASSESSMENT #1 AND FINAL ASSESSMENT #3

	Treatment Group #1		Treatment Group #2	
	Ass. #1 n = 23	Ass. #3 n = 23	Ass. #1 n = 23	Ass. #3 n = 23
Antibiotics	19	2	11	0
No Data	0	5	5	0
Anticonvulsants	13	10	10	4
No Data	0	5	3	0
Tranquilizers				
Daily	13	7	8	1
As Needed	3	2	1	2
No Data	0	1	2	1

time of Assessment #3 (See Table 25). Whereas 48 percent (n = 11) of the subjects were receiving both antibiotics and anticonvulsants at the time of Assessment #1, this number had significantly decreased at the time of Assessment #3 to 9 percent (n = 2). Whereas 52 percent (n = 12) of the subjects comprising Treatment group #1 were receiving antibiotics and tranquilizers at the time of Assessment #1 only 4 percent (n = 1) of the subjects were receiving both types of medication at the same time by Assessment #3. Data were unavailable for four subjects at the time of Assessment #3. Whereas 30 percent (n = 7) of the subjects comprising Treatment group #1 were receiving both tranquilizers and anticonvulsants at the time of Assessment #1, this percentage had significantly diminished to 13 percent (n = 3) by the time of Assessment #3. However, data were unavailable for five subjects comprising Treatment group #1.

For Treatment group #2 (n = 23) at the time of Assessment #1, over 43 percent (n = 10) were receiving anticonvulsant medication, whereas at the time of the final Assessment #3, 33 percent (n = 4) of the subjects remaining in Treatment group #2 (n = 12) were receiving such medication. In addition, at the time of Assessment #1 48 percent (n = 11) of the subjects comprising Treatment group #2 (n = 23) were receiving antibiotic medication on a regular basis for six months prior to the first assessment. Data were unavailable for five subjects comprising Treatment group #2. In contrast none of the remaining subjects (n = 12) were receiving antibiotic medication at

TABLE 25

MEDICATION FOR EACH GROUP,
ASSESSMENT #1 AND FINAL ASSESSMENT #3

	Treatment Group #1		Treatment Group #2	
	Ass. #1 n = 23	Ass. #3 n = 23	Ass. #1 n = 23	Ass. #3 n = 23
Antibiotics and Anticonvulsants	11	2	6	0
No Data	0	0	0	0
Antibiotics and Tranquilizers				
Daily	9	0	6	0
As Needed	3	1	1	0
No Data	0	4	2	0
Anticonvulsants and Tranquilizers				
Daily	5	2	4	0
As Needed	2	1	1	0
No Data	0	5	2	0

the time of the final assessment. At the time of Assessment #1, 39 percent (n = 9) of the subjects comprising Treatment group #2 (n = 23) were prescribed tranquilizers on a daily basis and as needed, whereas at the time of the final assessment, 13 percent (n = 3) of the remaining subjects (n = 12) were being prescribed tranquilizers on a daily basis and as needed. Overall, the results demonstrated a significant decrease in long term medication for subjects comprising both Treatment groups following program involvement.

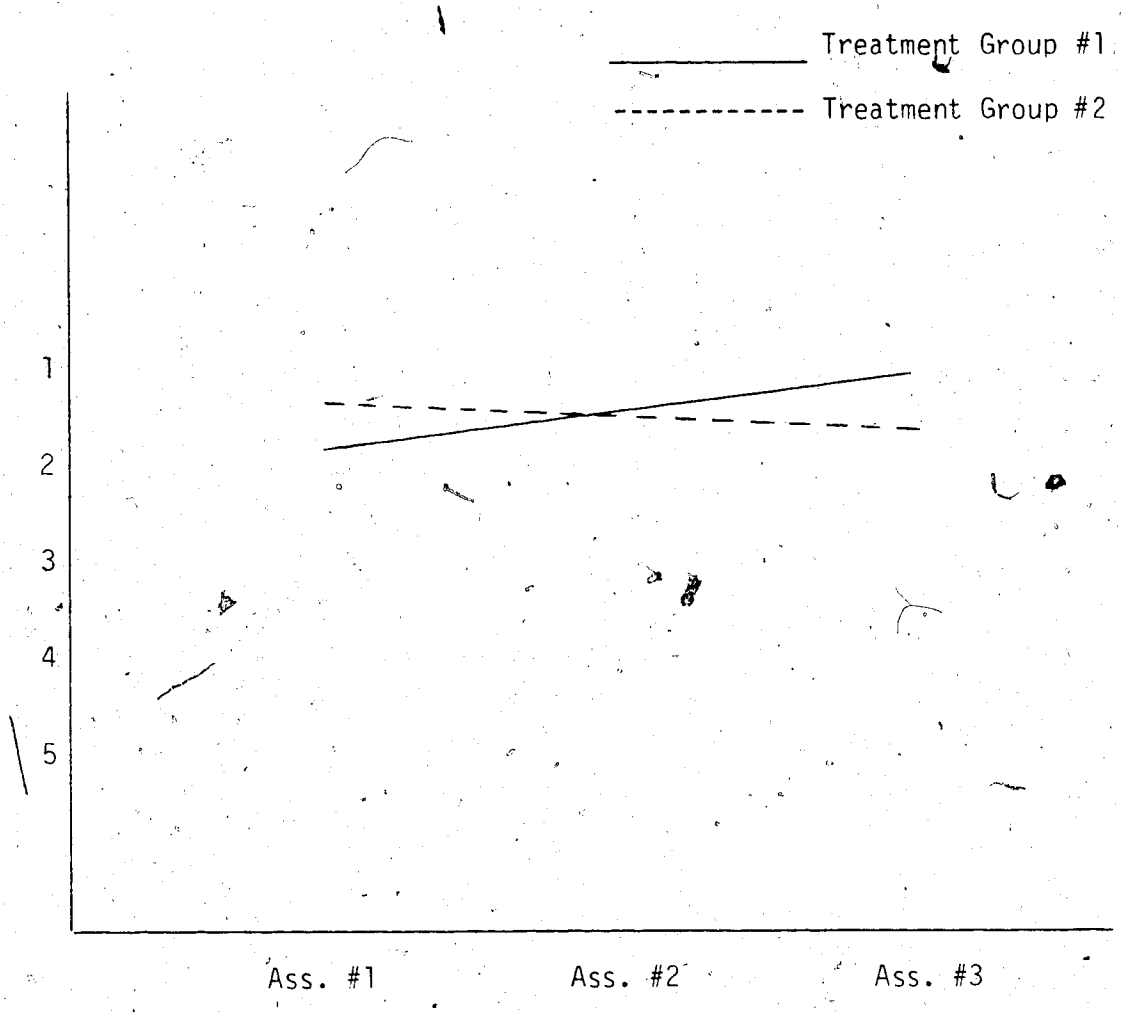
Medical Status of the Subjects

Health ratings (see Figure 1) indicated slight improvements over the time period between the first and final assessments for Treatment group #1 with the mean classification ranging between the moderate and stable categories at the peak of the Health Status rating scale. This finding is substantial in light of the major reduction in medications utilized for health care just described. For Treatment group #2, there was slight decreases in health ratings at the time of Assessment #2, and Assessment #3, although the mean classification remained within the moderate and stable categories.

In terms of various general health indicators, Table 26 provides an overview of the nurses' ratings for frequency of fevers, colds and days absent from programs due to illness (this Table describes data for subjects in both Treatment groups). Results indicated that at the time of the final assessment fewer subjects in Treatment group #1

FIGURE 1

MEAN SCORES
HEALTH RATING FOR EACH GROUP ACROSS EACH ASSESSMENT



1 Stable
2 Moderate
3 Fair
4 Poor
5 Unstable

TABLE 26

AVERAGE FREQUENCY OF FEVERS, COLDS, DAYS ABSENT

	Treatment Group #1		Treatment Group #2	
	Ass. #1	Ass. #3	Ass. #1	Ass. #3
	n = 23		n = 23	n = 12
Fevers (Frequency/Month)				
Number	15	8	4	8
Mean Occurrence	1.2	.70	.21	.13
Colds (Frequency/Month)				
Number	13	12	8	6
Mean Occurrence	0.9	1.5	.48	1.0
Absents (Frequency/Month)				
Number	11	15	5	8
Mean Occurrence	6.4	5.1	2.0	7.1

were experiencing fevers and colds, while Treatment group #2 subjects exhibited an increase in fever frequency after program initiation possibly accounting for the regression in the Health Status rating of Treatment group #2 subjects at the time of Assessment #3. However, there was no concomitant increase in days absent from the program. An overview of subject health status can also be derived from an examination of their hospital visits for surgical and medical purposes, as well as visits to a dentist or physician for services. Table 27 presents the frequency and mean length of stay for surgical hospital visits as well as other medical visits to the hospital for both Assessment #1 and the final assessment for both Treatment group subjects. Treatment group #1 subjects demonstrated an increase in the number of visits to the doctor and dentist at the time of Assessment #3, whereas there was a decrease in the number of visits made by Treatment group #2 subjects to the doctor and dentist at the time of Assessment #3.

As has already been noted, special services were obtainable for subjects through normative service delivery systems based in the communities. The number of subjects using these special services (physiotherapy, speech therapy and orthotics) at the time of Assessment #1 and at the time of the final assessment is shown in Table 28. In terms of physiotherapy, there was a decrease from 23 percent (n = 11) of the total sample using these services at the time of Assessment #1 to 11 percent (n = 4) of the total sample using

TABLE 27

HOSPITAL VISITS FOR EACH GROUP FOR ASSESSMENT #1 AND ASSESSMENT #3

	Treatment Group #1		Treatment Group #2	
	Ass. #1 n = 23	Ass. #3 n = 23	Ass. #1 n = 23	Ass. #3 n = 12
Hospital Surgery Orthopedic (Total Days/6 Months)				
Number	1	2	1	0
Mean Days	3.5	.20	0	0
Hospital Surgery Other (Total Days/6 Months)				
Number	0	0	3	2
Mean Days	0	0	.20	0
Hospital Medical Neurological (Total Days/6 Months)				
Number	1	2	1	0
Mean Days	.50	.30	0	0
Hospital Medical Respiratory (Total Days/6 Months)				
Number	1	1	2	0
Mean Days	.10	0	0	0
Hospital Medical Other (Total Days/6 Months)				
Number	0	2	3	2
Mean Days	0	.25	.70	1.3
Dentist Visits (Total Days/6 Months)				
Number	0	13	11	6
Mean Days	0	1.5	.60	.50
Doctor Visits (Total Days/6 Months)				
Number	14	21	13	11
Mean Days	1.7	3.0	1	3.9

TABLE 28

FREQUENCY OF SUBJECTS RECEIVING SPECIALIZED SERVICES

	Treatment Group #1		Treatment Group #2	
	Ass. #1 n = 23	Ass. #3 n = 23	Ass. #1 n = 23	Ass. #3 n = 12
Physiotherapy	8	2	3	2
Speech Therapy	0	0	0	0
Orthotics	1	1	1	1
Physiotherapy and Speech Therapy	1	1	1	0
Physiotherapy and Orthotics	1	1	0	0
No Data	0	2	0	0
Total Number	11	5	5	3

these services at the time of the final assessment. The use of orthotics remained stable over the total period. However, data were unavailable for six subjects at the time of the final assessment.

Rationale 2

The research questions to be addressed in this section sought to examine the extent of the relationship between communication skills and performance in the Pre-academic and Socialization skill areas. This study also attempted to determine whether this relationship was strengthened or weakened following program intervention. Finally, this analysis determined whether age was significantly related to performance in the Receptive/Expressive communication skill areas.

Research questions are addressed below as they appeared in Chapter III.

> Research Question 2.1: Analysis of overall scores may demonstrate a significant correlation between performance in the Receptive/Expressive communication skill areas and performance in the Pre-academic and Socialization skill areas for subjects comprising Treatment group #1, and Treatment group #2 at the time of Assessment #1 (pre-test measure of performance) and Assessment #3 (posttest measure of performance).

An inter-correlation analysis employing the Pearson product-moment correlation coefficient was carried out to determine the degree of concordance between sub-test ratio scores. Results (See Tables 29, 30) indicated that overall scores for Treatment group #1 subjects in Receptive communication skills were significantly correlated with performance in the primary Pre-academic and

TABLE 29

CORRELATIONAL ANALYSIS BETWEEN SUB-TEST SCORES ON RECEPTIVE COMMUNICATION SKILLS AND PRIMARY PRE-ACADEMIC AND SOCIALIZATION SKILLS

At the time of Assessment #1	Ass. #	Primary Pre-Academic Skills	Socialization Skills
Treatment Group #1			
Mean Age: 12.7 years	1	.37*	.61**
Range: 5 - 21	3	.73***	.82***

At the time of Assessment #1	Ass. #	Primary Pre-Academic Skills	Socialization Skills
Treatment Group #2			
Mean Age: 12.2 years	1	.86***	.91***
Range: 5 - 22	3	.90***	.68***

* $p < .05$
** $p < .01$
*** $p < .001$

TABLE 30

CORRELATIONAL ANALYSIS BETWEEN SUB-TEST SCORES ON EXPRESSIVE COMMUNICATION AND PRIMARY/ ADVANCED PRE-ACADEMIC AND SOCIALIZATION SKILLS

At the time of Assessment #1	Ass. #	Primary Pre-Academic Skills	Socialization Skills
Treatment Group #1			
Mean Age: 12.7 years	1	.21	.25
Range: 5 - 21	3	.73***	.68***

At the time of Assessment #1	Ass. #	Primary Pre-Academic Skills	Socialization Skills
Treatment Group #2			
Mean Age: 12.2 years	1	.57**	.64***
Range: 5 - 21	3	.61*	.33

* $p < .05$
** $p < .01$
*** $p < .001$

Socialization skill areas ($r = .37$, $p < .05$; $r = .61$, $p < .01$ respectively) at the time of Assessment #1 (pre-test measure of performance). For Treatment group #2 subjects results indicated a highly significant correlation between performance in Receptive communication skills and performance in the primary Pre-academic and Socialization skill areas ($p < .001$ respectively) at the time of Assessment #1 (pre-test measure of performance) as well.

For Treatment group #1 subjects at Assessment #3, the relationship between performance in Receptive communication skills and performance in the primary Pre-academic and Socialization skill areas was highly significant ($p < .001$ respectively). For Treatment group #2 subjects, the relationship between these sub-skill areas was already highly significant ($p < .001$ respectively). Program intervention did not significantly strengthen or weaken this relationship by the time of Assessment #3 (posttest measure of performance).

For Treatment group #1 subjects, results of the correlational analysis between sub-test scores in the Expressive communication and primary/advanced Pre-academic and Socialization skill areas indicated no significant correlation between these skill areas at the time of Assessment #1 (pre-test measure of performance -- see Table 30). However, following program intervention the relationship between these skill areas appeared to be strengthened. At the time of Assessment #3 (posttest measure of performance) results indicated

highly significant correlations between Expressive communication skills and performance in the primary Pre-academic and Socialization skill areas ($p < .01$, $p < .001$ respectively). However, for Treatment group #2, at the time of Assessment #3 (posttest measure of performance) the correlation between performance in Expressive communication skills and performance in the primary Pre-academic and Socialization skill areas was, statistically, substantially weakened (p .05, NS respectively).

> Research Question 2.2: There may be a significant correlation between performance in the Receptive communication skills area and performance in the Expressive communication skills area for subjects comprising both Treatment groups at the time of each assessment.

An inter-correlation analysis employing the Pearson product-moment correlation coefficient was carried out between sub-test scores in both Receptive and Expressive communication skill areas to determine the degree of concordance. Results (See Table 31) revealed a significant correlation (at the $p < .01$ level or higher) between performance in the Receptive communication skills area and performance in the Expressive communication skills area. This correlation was consistent for both Treatment group subjects at the time of each assessment.

> Research Question 2.3: There may be a significant correlation between chronological age of subjects and performance in Receptive and Expressive communication skill areas.

An inter-correlational analysis employing the Pearson

TABLE

CORRELATIONAL ANALYSIS BETWEEN SUB-TEST SCORES ON RECEPTIVE COMMUNICATION SKILLS AND EXPRESSIVE COMMUNICATION SKILLS

At the time of Assessment #1	Assessment #	Expressive Communication Skills
Treatment Group #1		
Mean Age: 12.7 years	1	.66**
	2	.80***
Range: 5 - 21	3	.78***

At the time of Assessment #1	Assessment #	Expressive Communication Skills
Treatment Group #2		
Mean Age: 12.7 years	1	.82***
	2	.83***
Range: 5 - 22	3	.76**

* $p < .05$
** $p < .01$
*** $p < .001$

product-moment correlation coefficient was carried out to determine the degree of concordance between chronological age of subjects and performance in the Receptive and Expressive communication skill areas. Results of the correlational analysis demonstrated that no significant correlation existed between age and performance in Receptive and Expressive skill areas at the time of each assessment for either of the Treatment groups.

Rationale 3

The research hypotheses to be addressed in this section sought to examine the extent of the relationship between primary/advanced Gross motor performance and performance in the Pre-academic and Self-help skill areas. This study also questioned whether the degree of the relationship was strengthened or weakened following intervention. Finally, this study investigated whether age was significantly related to performance in the primary/advanced Gross motor skill areas.

Research questions are addressed below as they appeared in Chapter III.

> Research Question 3.1: Analysis of overall scores may demonstrate a significant correlation between performance in the primary/advanced Gross motor skill areas and performance in the Pre-academic and Self-help skill areas for subjects comprising both Treatment groups, at the time of Assessment #1 (pre-test measure of performance) and Assessment #3 (posttest measure of performance).

An inter-correlational analysis was carried out employing the

Pearson product-moment correlation coefficient to determine the degree of concordance between sub-test scores. Results (See Table 32) indicated that overall scores for Treatment group #1 subjects in the primary Gross motor skills area were significantly correlated with performance in the primary Pre-academic and Self-help skill areas ($p < .001$ respectively) at the time of Assessment #1 (pre-test measure of performance). For Treatment group #2 subjects overall scores in the primary Gross motor skills area were significantly correlated with performance in the primary Pre-academic and Self-help skill areas ($p < .01$ respectively) at the time of Assessment #1 (pre-test measure of performance).

For Treatment group #1 subjects, these relationships appeared to significantly weaken following program intervention between primary Gross motor performance and performance in the primary Pre-academic and Self-help skill areas ($p < .05$ respectively) as measured at the time of Assessment #3. For Treatment group #2 subjects the significance of the correlations between performance in the primary Gross motor skill area and the performance in the primary Pre-academic and Self-help skill areas ($p < .01$, $p < .05$ respectively) was not altered at the time of Assessment #3 (posttest measure of performance).

For Treatment group #1 subjects, results of the correlational analysis between sub-test scores in the advanced Gross motor and primary Pre-academic and Self-help skill areas indicated a

TABLE 32

CORRELATIONAL ANALYSIS BETWEEN SUB-TEST SCORES ON PRIMARY GROSS MOTOR SKILLS AND PRIMARY PRE-ACADEMIC, SELF-HELP, AND SOCIALIZATION SKILLS

At the Time of Assessment #1	Ass. #	Primary Pre-Academic Skills	Self-Help Skills	Socialization Skills
Treatment Group #1				
Mean Age: 12.7 years	1	.78***	.83***	.50*
Range: 5 - 21	3	.37*	.38*	.39*
At the Time of Assessment #1	Ass. #	Primary Pre-Academic Skills	Self-Help Skills	Socialization Skills
Treatment Group #2				
Mean Age: 12.2 years	1	.50**	.51**	.39*
Range: 5 - 22	3	.73**	.56*	.56*

* $p < .05$
** $p < .01$
*** $p < .001$

significant correlation ($p < .01$, $p < .05$ respectively) between these skill areas at the time of Assessment #1 (pre-test measure of performance) (See Table 33). For Treatment group #1 subjects, results of the correlational analysis between sub-test scores in the advanced Gross motor and primary Pre-academic and Self-help skill areas indicated a significant correlation ($p < .01$, $p < .05$ respectively) was not altered at the time of Assessment #3 (posttest measure of performance). For Treatment group #2 subjects, a significant correlation was found to exist between performance in the advanced Gross motor skills area and performance in the Self-help skill areas ($p < .05$) at the time of Assessment #1 (pre-test measure of performance).

For Treatment group #1 subjects, the relationship between advanced Gross motor performance and performance in the primary Pre-academic and Self-help skill areas was diminished following program intervention. At the time of Assessment #3 (posttest measure of performance) a significant correlation was only found to exist between the advanced Gross motor and Self-help skill areas ($p < .05$). For Treatment group #2 subjects the relationship between advanced Gross motor skills and performance in other skill areas seemed to be strengthened following program initiation. At the time of Assessment #3 significant correlations were found to exist between performance in the advanced Gross motor skill area and performance in the primary Pre-academic and Self-help skill area ($p < .05$, $p < .01$ respectively).

TABLE 33

CORRELATIONAL ANALYSIS BETWEEN SUB-TEST SCORES ON ADVANCED GROSS MOTOR SKILLS AND EXPRESSIVE COMMUNICATION, PRIMARY PRE-ACADEMIC, SELF-HELP, AND SOCIALIZATION SKILLS

At the Time of Assessment #1	Ass. #	Expressive Communication Skills	Primary Pre-Academic Skills	Self-Help Skills	Socialization Skills
Treatment Group #1					
Mean Age: 12.7 years	1	.38*	.49**	.53*	.34*
Range: 5 - 21	3	.22	.05	.36*	.10

At the Time of Assessment #1	Ass. #	Expressive Communication Skills	Primary Pre-Academic Skills	Self-Help Skills	Socialization Skills
Treatment Group #2					
Mean Age: 12.2 years	1	.29	.13	.39*	.05
Range: 5 - 22	3	.79**	.55*	.72**	.27

* $p < .05$
** $p < .01$
*** $p < .001$

Research Question 3.2: There may be a significant correlation between performance in the primary Gross motor skill area and performance in the advanced Gross motor skill area for both Treatment group subjects.

An inter-correlational analysis employing the Pearson product-moment correlation coefficient was carried out to determine the degree of concordance between performance in the primary and advanced Gross motor skill areas. Results (See Table 34) demonstrated that a significant correlation existed at the .05 level or higher between these two skill areas for both Treatment group subjects at the time of each assessment.

Research Question 3.3: There may be a significant correlation between chronological age of subjects and performance in primary/advanced Gross motor skill areas.

An inter-correlational analysis employing the Pearson product-moment correlation coefficient was employed to determine the degree of concordance between chronological age and performance in primary/advanced Gross motor skill areas. Results of the correlation analysis revealed that no significant correlation existed between age and performance in these skill areas for either Treatment group subjects at the time of each assessment.

TABLE 34

CORRELATIONAL ANALYSIS BETWEEN SUB-TEST SCORES ON PRIMARY GROSS MOTOR SKILLS AND ADVANCED GROSS MOTOR SKILLS

At the time of Assessment #1	Assessment #	Advanced Gross Motor Skills
Treatment Group #1		
Mean Age: 12.7 years	1	.52**
	2	.35*
Range: 5 - 21	3	.44*

At the time of Assessment #1	Assessment #	Advanced Gross Motor Skills
Treatment Group #2		
Mean Age: 12.2 years	1	.35*
	2	.51*
Range: 5 - 22	3	.45*

* $p < .05$
** $p < .01$
*** $p < .001$

CHAPTER VI

DISCUSSION

The purpose of this study was to assess the impact of the Resources for the Dependent Handicapped project on the subjects involved, in terms of gains in performance in each of the skill areas defined by the criterion-referenced assessment device, and to determine the medical and health status of the subjects prior to and following intervention. Furthermore, this study sought to examine the effects of communication and gross motor performance in relation to performance in other functional skill areas, and to assess the extent to which overall levels of competency were influenced by competency in these two skill areas.

Rationale 1 proposed that subject's comprising Treatment group #1 would be expected to exhibit gains in performance in each of the developmental skill areas as compared to Treatment group #2 subjects whose performance would be expected to reflect minimal changes in performance until the implementation of treatment after the second pre-test. Rationale 1 also sought to show that program intervention would result in improvements in health ratings over the total assessment period for both Treatment group subjects.

Treatment group #1 subjects demonstrated significant gains in each of the skill areas defined by the device, except for Receptive Communication and Socialization skills. In contrast, Treatment group #2 subjects did not register any significant gains in Communication,

Pre-academic, or Gross Motor skills. However, these subjects did demonstrate significant gains in Self-help and Socialization skills between Assessments #2 and #3 as a result of program intervention.

In terms of medical status, mobility of Treatment group #1 subjects improved over the total assessment period. At the time of Assessment #1 60 percent (n = 14) exhibited no mobility. At the time of Assessment #3 39 percent (n = 9) of Treatment group #1 subjects exhibited no mobility. Seizure frequency of all subjects decreased over the total assessment period. Moreover, there was also a reduction in the use of antibiotics, anticonvulsants and tranquilizers, prescribed either singly or in combination, without a concomitant increase in fevers, colds or seizures.

Health ratings for all subjects remained within the stable to moderate categories. Furthermore, more Treatment group #1 subjects made visits to the doctor and dentist, revealing a trend to more fully utilize community services. The limited number of subjects making use of community-based services, particularly in the areas of physiotherapy, speech therapy and orthotics, suggested either a lack of availability of these services to the R.D.H. project, or the limited use to which these services were being put by personnel within the R.D.H. project. Subject mortality in Treatment group #2 proved particularly problematic in terms of defining the impact of the Resources for the Dependent Handicapped project. Medical status could only be evaluated for those subjects remaining at the time

Assessment #3 (n = 20).

Rationale 2 sought to determine whether overall levels of competency in each of the skill areas defined by the criterion-referenced assessment device were related to the degree of communication receptivity which the severely and profoundly handicapped individual had at his/her command. Subjects comprising both Treatment groups were expected to demonstrate significant gains in Receptive and Expressive communication skill areas as a result of benefiting from an ongoing day and residential program which provided a basis for interaction.

The inter-correlational analysis carried out to determine the degree of concordance between sub-test ratio scores revealed that Receptive communication skills were significantly correlated with Expressive communication skills, primary Pre-academic skills and Socialization skills. It is possible that early communication skills may constitute important prerequisites or corequisite skills for early problem solving and social responsiveness.

Results of the criterion-referenced assessment in the Receptive communication skill area for both Treatment group subjects indicated that program intervention exerted little effect upon the correlational relationships examined. Receptive communication skills were frequently limited by attention deficiencies. Many subjects comprising both the Treatment groups demonstrated a response to basic sounds, e.g. bell being rung to one side of subject, but failed to

respond to simple commands of comprehension items at more complex levels. Furthermore, results indicated that if receptive language skills are minimal or non-existent, the task of equipping such subjects with a basic response repertoire is a difficult and lengthy one. The significant ($p < .05$) increase in ratio scores for Treatment group #1 subjects in the Expressive communication skill area demonstrated that once equipped with communication facility, subjects have a base from which a more complex communication repertoire may be developed. For Treatment group #2 subjects, performance in the Expressive communication skill area occasionally included emission of sounds but seldom was there any imitation of speech sounds/words or spontaneous verbalization. At the time of the final assessment, only two subjects employed an adjunctive communication device (head pointer).

The minimal gains registered for both Treatment group subjects in the Receptive communication skills area, suggested the need for adjunctive communication aids such as Bliss symbols, head pointers or automated aides (Vanderheiden and Grilley, 1975) to be used with severely/profoundly handicapped individuals. Other communication codes such as eye-pointing or foot tapping may have been useful to aid the Yes/No communication (Wendt, Sprague, and Marquis, 1975), which in turn would serve as the basis for further language/communication instruction.

Neisworth and Smith (1978) have suggested that before any

language training is initiated with individuals who function at a very low level, it is important to determine whether there is hearing loss. Because of maladaptive behaviours and frequent unresponsiveness of this population, it is essential to find reliable ways to evaluate auditory acuity. The lack of available data on the incidence of auditory disorders posed a major problem for developing appropriate intervention and remediation strategies, and could significantly account for the minimal gains in the Receptive language area.

Rationale 3 sought to determine whether overall levels of competency in each of the skill areas defined by the criterion-referenced assessment device were related to the degree of gross motor performance which the subject had at his/her command. This study has proposed that if an abnormal anatomical structure deprives the severely and profoundly handicapped individual of meaningful interaction with the environment, then performance in all functional skill areas is bound to be marred. Subjects comprising both Treatment groups would be expected to demonstrate significant gains in the primary/advanced Gross motor skill areas as a result of benefiting from an ongoing day and residential program where gross motor and self-help training is stressed.

Results revealed that primary Gross motor scores were significantly correlated with scores in the Expressive communication, primary Pre-academic, Self-help and Socialization skill areas.

Further research may indicate the extent of this relationship between early neuromuscular development and basic sensory-motor, feeding, dressing, personal care skills, and social responsiveness.

Summary

Results indicated that efforts to improve the general standard of health care of subjects involved in the R.D.H. project were having a positive effect. Unfortunately, specialized community based services in the areas of physiotherapy, speech therapy and orthotics had yet to be fully utilized within the context of the R.D.H. project. There were significant improvements for both Treatment groups in communication, problem solving, self-help and social skills as a result of program intervention.

Results of this study have also shown that there was a significant correlation between communication receptivity and performance in other skill areas. Further research may indicate whether this link is causal. Moreover, gross motor performance was significantly correlated with performance in other functional skill areas. Again, further research may indicate a possible causal link.

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APPENDIX 1

Resources for the Dependent Handicapped Client Code Ø25

Health Assessment Form

This form is intended to assess:

1. The health-status of persons served through R.D.H.
2. The quality of health-care provided to R.D.H. clients.

Assessment of the above will be done over several time intervals in order to evaluate health status and standards within the R.D.H. service system.

Finished Date: _____/_____/_____

Assessment No. _____

Accumulator: _____

FOR OFFICE USE ONLY

6-11

12

13-14

I. Demographic Data

1. Name client: [redacted] _____ First: _____

15-80

I.I. ___ / 03/ 5

Ass.# ____ 6

2. Sex Male: _____ Female: _____ 7

3. Birthdate: Day: _____ Month: _____ Year: _____ 8-13

4. R.D.H. group home name (leave blank if at home _____ 14-15

5. Pre-R.D.H. residence _____ 16-17

6. Pre-R.D.H. program _____ 18-19

To be completed for Earl Bergef Limited the day prior to the developmental assessment.

II. Health Status Indicators

	Item	Statistical description and time period	Number	Location	FOR OFFICE USE ONLY cc
7.	height	total cm. most recent recording	_____	File (5yr.)	20-22
8.	weight	total kg. most recent recording	_____	File (5yr.)	23-25
	Illness				
9.	fever (over 38°C)	frequency/6 months to date	_____	File (5yr.)	26-28
10.	colds/flu	frequency/6 months to date	_____	File (5yr.)	29-31
11.	Other illnesses (list on back)		_____		32-34
12.	all illnesses (sick at home from school)	total days/6 months to date	_____	File (5yr. & progress note)	35-37
13.	seizures	frequency/most recent month	_____	File (5yr.)	38-40
14.	seizures	median duration/most recent month	_____	File (daily seizures)	41-43
15.	allergies(non food)	_____ Yes _____ No _____ No data		kardex	44
16.	dental	no. of cavities/last visit _____		File (Progress notes)	45-46

17. Impression of general health status to be received from following staff:

Nurse's Name: _____

R.C. III Name: _____

Please circle appropriate number:

1	2	3	4	5	
stable	moderate	fair	poor	unstable	47

III. Health Care Indicators	Statistical description and time period	Number Number	Location	FOR OFFICE USE ONLY cc
18. Hospital Visits				
I. emergency	frequency/6 months to date	_____	File (5 yr.)	48-49
II. overnight stays				
A. surgery	total days/last 6 months	_____	File (progress notes)	50-51
1. orthopedic				
2. other (list on back)		_____	— —	52-53
B. medical				
1. neurological	total days/last 6 months	_____	File (pro.no)	54-55
2. respiratory	total days/last 6 months	_____	File (pro.no)	56-57
3. other (list on back)		_____	— —	58-59
19. Doctor's office visits	frequency/6 months	_____	File " "	60-61
20. Dental office visits	frequency/ 6 months	_____	File " "	62-63
21. Receiving specialized prescribed rehabilitation services	1. No.2.physio-therapy 3. Speech Therapy 4.Orthotics 5. Occupational Therapy 6. Other (list on back		File (pro.notes)	64-65
Medications				
22. Anti-biotics(long term)	6 months/to date	___ ___ _____ No Yes No data	Kardex	66
23. Anti-biotics (5-10 days)	total days/6 months to date	_____	File (Dr. orders)	67-68
24. Anti-convulsants	6 months to date	___ ___ _____ No Yes No data	Kardex	69
25. Number of times prescribed dosage of anti-convulsants has changed due to increased seizures and/or low anti-convulsant blood levels.	frequency/6 months to date	_____	File (Dr. orders) Progress notes)	70-71
26. Number of times prescribed dosage of anti-convulsants has changed due to decreased seizures and/or high anti-convulsant blood levels	frequency/6 months to date	_____	File (Dr. orders) Progress notes)	72-73

Health Care Indicators (Con't)

	Item	Statistical description				Number	Location	FOR OFFICE USE ONLY cc
27.	Tranquilizers/ sedatives	frequency of administration					File(Dr. orders)	74
		None	Daily	PRN				
28.	Enemas	total/1 month to date				_____	BM Chart	75-76
	Diets (Special)							
29.	Allergies food	6 months to date	Yes	No	No Data		Kardex	77
30.	High caloric	6 months to date	Yes	No	No Data		Doctor's order	78
31.	Low caloric	6 months to date	Yes	No	No Data		Doctor's order	79
32.	Other special diets	6 months to date	Yes	No	No Data		Doctor's order	80

Significant Comments:

APPENDIX 2

COMMUNICATION (RECEPTIVE)

cc

DATE STARTED: __ / __ / __ 1-5

CLIENT CODE _ _ _ / _ _ 6-11

RATER CODE: __ 12

DATE FINISHED _ _ / _ _ / _ _

ASSESSMENT # __

Trials	Levels 1	2	3	Comments	
1. a) * Physical response toward staff					13
b) * response to negative, inappropriate peer contact					14
c) * response to positive or appropriate peer contact					15
d) * Verbal response to communication					16
2. * respond to sound					17
3. * turn to sound					
a) right					18
b) left					19
(4.) look toward verbalization					20
(5.) respond to name				Levels 5,4 only	21
(6.) respond to word gesture				To level 3 only	22

COMMUNICATION (RECEPTIVE)

Trials	Levels 1	2	3	Comments	cc
7. respond to "look here"					23
8. respond to nouns of toys, clothes					
a. sock					24
b. hat					25
c. ball					26
d. car					27
9. respond to:					
a. ball					28
b. doll					29
(10.) respond to single action command	1	2	3	Examples (Criterion -3) 1. _____ 2. _____ 3. _____	30
11. respond to nouns of animals, food items in a room					
a. dog					31
b. horse					32
c. cracker					33
d. banana					34
e. table					35
f. chair					36

COMMUNICATION (Receptive)

Trials	1	2	3	Comments	cc
	Levels				
12. respond to in					37
13. respond to on					38
14. respond to out					39
15. respond to off					40
16. respond to:					
a. big					41
b. little					42
17. point to body parts					
a. nose					43
b. hair					44
c. eyes					45
d. mouth					46
e. ears					47
f. legs					48
g. fingers					49
h. foot					50
i. arms					51
j. hand					52
18. respond to under					53

COMMUNICATION (RECEPTIVE)

Trials	1	2	3	Comments	cc
	Levels				
19. respond to beside					54
20. respond to 2 - object command				Commands used: 1. _____ 2. _____	55
21. respond to 2 - action command				Commands used: 1. _____ 2. _____	56
22. select:				To level 3 only	
a. rough					57
b. smooth					58
23. respond to 3 - action command				Commands used: 1. _____ 2. _____ 3. _____	59
24. Literal Details Recalled				5 or 0 only - structured	60

COMMUNICATION (EXPRESSIVE)

DATE STARTED: __/ __/ __

RATER CODE: __

CLIENT CODE : _ _ _ / _ _

DATE FINISHED _ _ / _ _ / _ _

ASSESSMENT # __

Trials	1	2	3	Comments
	Levels			
25. *different pleas, and non-pleasurable sounds				
26. imitate 2 single motor actions 1				Actions used: 1. _____
2				2. _____
27. *use gestural language				
28. *emit vowel sounds spontaneously				Sounds heard:(Criterion - 2) 1. _____ 2. _____ Others _____
29. *emit cons. sounds spontaneously				Sounds heard: (Criterion -2) 1. _____ 2. _____ Others _____

cc

1-5

6-11

12

13

14

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16

17

18

COMMUNICATION (EXPRESSIVE)

Trials	Levels 1	2	3	Comments	cc
30. *emit vowel-cons. combos.				Sounds heard? (Criterion - 1) _____ _____ Others_____	__19
31. *babbling sounds like sents.					__20
32. imitate non-speech sounds				To level 3 only Sounds used: (Criterion-1) _____ _____ Others_____	__21
33. imitate 4 speech sounds				Sounds used: 1. _____ 2. _____ 3. _____ 4. _____	__22 __23 __24 __25
a. vowels 1.					
2.					
b. cons./vowels 1.					
2.					
34. *imitate talk w/sounds N.B. circle 5 if client uses words					__26
(35.) return bye-bye				To Level 3 only	__27
36. *respond negatively					__28

COMMUNICATION (Expressive)

Trials	Levels 1 2 3	Comments	cc
37. *respond affirmatively			29
38. *name wanted object		Examples: (Criterion - 3) 1. _____ 2. _____ 3. _____	30
39. *ask for names of objects		Examples: (Criterion - 3) 1. _____ 2. _____ 3. _____	31
40. *use verbs		Examples: (Criterion - 3) 1. _____ 2. _____ 3. _____	32
41. *use pronouns		Examples: (Criterion-2) 1. _____ 2. _____ Others _____	33

COMMUNICATION (EXPRESSIVE)

Trials	1	2	3	Comments	cc
	Levels				
42. *use regular plurals				Examples: (Criterion - 3) 1. _____ 2. _____ 3. _____	34
43. tell action				To Level 3 only	35
44. relate immed. experiences				To Level 3 only	36
45. *ask questions				Examples: (Criterion - 2) 1. _____ 2. _____ Others _____	37
46. *use 4 word phrases				Examples: 1. _____ Others _____	38
47. *use prepositional phrases				Examples: 1. _____ Others _____	39

Trials	Levels 1	2	3	Comments	cc
48. *use adjectives				Examples: (Criterion - 3) 1. _____ 2. _____ 3. _____	40
49. *use "to be"				Examples: (Criterion - 3) 1. _____ 2. _____ 3. _____ Others _____	41
50. *use negatives				Examples: (Criterion - 2) 1. _____ 2. _____ Other(s)_____	42
51. *use possessive pronouns				Examples: (Criterion - 2) 1. _____ 2. _____ Other(s) _____	43
52. describe function of object				[illegible]0-can be structured [illegible]e: (Criterion - 1) _____ Other(s) _____	44

COMMUNICATION (Expressive)

Trials	Levels 1 2 3	Comments	cc
53. *use past tense		Examples: (Criterion - 2) 1. _____ _____ 2. _____ Other(s). ___ . _____	__45
54. *ask "why" questions		Examples: (Criterion - 2) 1. _____ 2. _____ Other(s) _____	__46
55. *give complete sent descript descript		Examples: (Criterion - 2) 1. _____ 2. _____ Other(s) _____	__47
56. identify materials		To Level 3 only Examples: (Criterion - 3) 1. _____ 2. _____ 3. _____	__48
57. 3-idea story		To Level 3 only	__49

COMMUNICATION (EXPRESSIVE)

Trials	1	2	3	Comments	cc
	Levels				
58. *use future tense				Examples: (Criterion - 2) 1. _____ 2. _____ Other(s) _____	50
59. *use dependant clauses				Examples: (Criterion - 2) 1. _____ 2. _____ Other(s)_____	51
60. *tell similarities/ differences				5 or 0 structured. Examples: 1. _____ 2. _____ Other(s)_____	52

R.D.H.

PRE-ACADEMIC

cc

DATE STARTED _ _/_ _/_ _ 1-5

CLIENT CODE _ _ _/_ _ 1-5

RATER CODE: __ 6-11

DATE FINISHED: _ _/_ _/_ _ 6-11

assessment # __ 12

PRETEST					
Trials	1	2	3	Comments	
Visual Perception	Levels				
(1.) focus eyes					13
(2.) look directly at face					14
(3.) eye track 90°					15
(4.) eye track 180°					16
Reach, Grasp, Release					
(5.) reach for object					17
(6.) grasp handle					18
(7.) pick up cube in each hand					19

*8. voluntary grasp-				S or U-structured	2.
a. rake					20
b. finger thumb					21
c. pincer					22
*9. one hand places cube into other					23
10. put cube into container					24
11. cubes towered					25
Perceptual Motor					
12. Rings put on stick					26
13. put pegs in holes					27
14. turn pages singly					28
15. string beads					29
16. hammer pegs					30
17. snip paper					31
18. cut 2" strip					32

PRE-ACADEMIC

	Trials	1	2	3	Comments	cc
		Levels				
19.	cut a. line					33
	b. circle					34
20.	3 block blidge					35
	Sequencing					
21.	imitate 3 motor sequence	1	2	3	To level 3 only Sequence used: 1. _____ 2. _____ 3. _____	36
22.	repeat block/bead pattern				To level 3 only	37
	Puzzles					
23.	put shape in template	C	S	T		38
24.	3-piece puzzle non-interlocking					39
25.	6-piece puzzle interlocking				To level 3 only	40
26.	15-piece puzzle				To level 3 only	41

Writing					
*27. hand preference					42
*28. mature pencil grasp				5 or 0-structured	43
29. scribble					44
30. imitate loop					45
31. imitate zig-zag stroke					46
32. imitate circle					47
33. imitate plus (+)					48
34. trace line					49
35. imitate square					50
*36. draw person				5 or 0-structured	51
37. copy first name					52
38. print first name					53
*39. print alphabet				5 or 0-structured Criteria -13 letters or more	54

PRE-ACADEMIC

cc

CLIENT CODE ___/__ 1-5

DATE FINISHED __/__/__ 6-11

ASSESSMENT # __ __12

5.

Trials	1	2	3	Comments	
	Levels				
Pre-Reading					
40. match letters					__13
*41. letters selected				5 or 0-structured A F V J H L P M O T B C N O Y U X D Y Z R E W K S I O E A U	__14
*42. letters named				5 or 0-structured A B C D E F G H I J K L M N O P Q R S T U V W X Y Z	__15
*43. read functional wds.(5)				5 or 0-structured	__16
Discrimination					
44. match objects				Objects matched: 1. _____ 2. _____ 3. _____	__17
45. match lottos				Lottos matched: 1. _____ 2. _____ 3. _____	__18

46. match colours					To Level 4 only	
a. red						19
b. yellow						20
c. blue						21
d. purple						22
e. orange						23
f. green						24
47. colour selected					To Level 3 only	
a. red						25
b. yellow						26
c. blue						27
d. purple						28
e. orange						29
f. green						30
48. colours named					To Level 3 only	
a. red						31
b. yellow						32
c. true blue						33
d. purple						34
e. orange						35
f. green						36
49. match shapes					To Level 3 only	
a. triangle						37
b. square						38
c. circle						39

Trials	1	2	3	Comments	cc
	levels				
50. shapes selected				To Level 3 only	
a. triangle					40
b. square					41
c. circle					42
51. shapes named				To Level 3 only	
a. triangle					43
b. square					44
c. circle					45
d. rectangle					46
e. oval					47
52. sort cars/blocks					48
53. sort on 2-dimensions					49
Pre-Math					
54. Rote counted (to 10)				To Level 3 only	50
55. objects counted				To Level 3 only	51
(a)(to 10) 1 2 3					
(b) 4 5 6					52
(c) 7 8 9 10					53

Trials	1	2	3	Comments	cc
	Levels				
56. numerals selected				To Level 3 only	
(a) 0					54
1					
2					
3					
(b) 4					55
5					
6					
(c) 7					56
8					
9					
10					
57. numerals read				To Level 3 only	
(a) 0					57
1					
2					
3					
(b) 4					58
5					
6					
(7) 7					59
8					
9					
10					

PRE-ACADEMIC

	Trials	1	2	3	Comments	cc
		levels				
58. numerals put in order (1-10)	1				To Level 3 only	
	2					60
	3					
	4					
	5					61
	6					
	7					
	8					
	9					62
	10					
59. sets matched (no. to quant. 1-10)	1				To Level 3 only	63
	2					
	3					64
	4					
	5					
	6					
	7					65
	8					
	9					
	10					
60. quantities matched	1				To Level 3 only	
	2					
	3				average	66
	4					
	5					
Right, Left						
*61. show a. right						67
b. left						68

GROSS MOTOR

DATE STARTED: _ _/_ _/_ _

RATER CODE: __

CLIENT CODE _ _ _/_ _

DATE FINISHED ___/_ _/_ _

ASSESSMENT # __

1.

cc

1-5

6-11

12

Primary Skills - Trials	1	2	3	Comments	
Early Neuromuscular Dev.	Levels				
1. *limb used: a. left arm				Note Recor[illegible] if any type of movement Record "(S)" if functional use of limb i.e.,controlled/ range	13
b. right arm					14
c. left leg					15
d. right leg					16
(2) hands to midline,supine					17
(3) head to midline, supine					18
(4) pull to sit, no head lag					19
(5) lift head in midline,supine					20
(6) roll back to stomach					21
(7) lift head 90° in midline prone					22
(8) prop on extended arms,prone					23

(9)	Reach when propped on forearms a. right arm					26
	b. left arm					27
(10)	pivot on stomach					28
11.	*sit without support					29
(12)	prone to sitting					30
(13)	a. creep					31
	b. crawl					
14.	*bear weight on legs					
Ball Skills						
(15)	roll ball					32
(16)	kick ball				Adaptation used:	33
(17)	kick rolling ball				Adaptation used:	34
(18)	capture ball thrown to arms					35
(19)	throw ball overhead					36

Trials	1	2	3	Comments	cc
	Levels				
(20.) catch bounced ball					37
Rhythm					
21. *stamp, clap to music a. hands					38
b. feet					39
				Rater Code	80
				CLIENT CODE ___/__	1-5
				DATE FINISHED __/__/__	6-11
				ASSESSMENT # __	12
Advanced Skills					
Walking Skills					
22. *stand holding on					13
(23.) pull to stand					14
(24.) stand to sit a. mat					15
b. chair					16
25. *walk with support a. two hands held					17
b. one hand held					18
26. *stand without support					19

Trials	1	2	3	Comments	cc
	Levels				
27. *walk independently a. 6 steps					20
b. 50 steps					21
28. *walk carrying object with two hands				5 or 0-structured	22
29. *pivot-walking					23
30. *squat					24
(31) stoop to recover object					25
(32) walk incline a. up					26
b. down					27
(33) walk backward					28
34. *walk on tiptoe					29
35. *walk on heels					30
(36) stoop to walk under bridge					31
Up,Down Stairs					
(37) walk upstairs, 1 ft. lead				If client scores 5,4,3 on skills #37 and/or #38 test skills #39 If client scores 2,1,0 score U/T for skills #39 and #40	32
(38) walk downstairs,1 ft.lead					33

GROSS MOTOR

Trials	1	2	3	Comments	cc
	Levels				
(39) walk up, alternate feet					34
(40) walk down, alternate feet					35
Jumping, Coordination					
(41) jump in place					36
(42) jump down (8 inches)					37
(43) step over raised bar					38
(44) stand on one foot a. right					39
b. left					40
(45) jump over raised bar					41
(46) hop in place					42
(47) somersault					43
(48) standing long jump					44
(49) running jump					45
(50) hop forward					46

Trials	1	2	3	Comments	cc
	Levels				
Dynamic Balance					
(51.) walk 8" wide board					47
(52.) walk balance beam					48
(53.) walk 1" line					49
54. *walk forward heel-to-toe					50
55. *walk backward heel-to-toe					51
(56.) walk balance beam backward				To Level 3 only	52
Equipment					
(57.) climb ladder					53
(58.) descend ladder					54
(59.) use slide unassisted a. on tummy				To Level 3 only	55
b. sitting					56
(60.) ride trike				To Level 3 only	57
61. *ride and steer trike					58

DATE STARTED __/__/__

RATER CODE: __

CLIENT CODE: ___/__ 1-5

DATE FINISHED __/__/__ 6-11

assessment # __ 12

Trials	1	2	3	Comments	
Feeding	Levels				
1. *suck liquid from bottle				Score 5 if eats semi-solid food.	__13
(2) self-feed cracker					__14
3. *drink from cup					__15
(4) a. take glass					__16
b. lift glass					__17
c. retain glass					__18
d. return glass					__19
(5) bring spoon to mouth					__20
(6) eat solid food with spoon					__21
(7) turn water faucet a. on					__22
b. off					__23

Trials	1	2	3	Comments 5 or 0-structured	cc
	Levels				
8. *carry filled cup					24
(9) pour liquid from pitcher to cup					25
Dressing					
10. *cooperate while being dressed					26
(11) self-remove sock					27
(12) remove coat					28
(13) pull down pants					29
(14) pull up pants					30
(15) put coat on					31
(16) unzip					32
(17) pull on shoe					33
(18) pull on pull-over shirt					34
(19) buttons a. unfasten					35
b. fasten					36

	Trials	1	2	3	Comments	cc
		Levels				
(20)	snaps a. unsnap					37
	b. snap					38
(21.)	zip incl. thread zipper					39
Toiletting						
22.	*sit on toilet					40
23.	*use toilet 50%					41
24.	*indicate must use toilet					42
25.	*use toilet independently					43
Washing/Grooming						
(26)	a. wash hands					44
	b. dry hands					45
(27)	a. wash face					46
	b. dry face					47
(28)	a. brush					48
	b. comb					49

SOCIAL CHECKLIST - OBSERVATION

cc

DATE STARTED: _ _/_ _/_ _ 1-5

CLIENT CODE: _ _ _/_ _ 6-11

RATER CODE: __ 12

DATE FINISHED _ _/_ _/_ _

ASSESSMENT # __

Observations	5	0	Comments	
*Adaptive Self-Directed Behaviors				
1. a. Generalized Activity/ Exploratory Activity				__13
b. Recreational Activity				__14
c. Self Regard				__15
Adaptive Interpersonal Behaviors				
*Fundamental Social Behaviors: Non-Communication				
2. a. Approaches				__16
b. Responds Physically				__17
c. Initiates Physical Contact				__18
*Fundamental Social Behaviors: Social Vocalizations and Gestures				
3. a. Responds with Social Vocalization				__19

SOCIAL CHECKLIST - OBSERVATION

Observations	5	0	Comments	cc
b. Initiates Social Vocalizations				20
*Object Relations				
4. Appropriate Use of Objects				21
*Playful Contact				
5. a. Responds Playfully				22
b. Initiates Playful Contact				23
Play				
*Interact appropriately with materials				
6. a. Group Activities				24
b. Individual Program				25
c. During Free Time				26
*Interact Appropriately with Peers				
7. In Group Activities				27
b. During Free Play				28

SOCIAL CHECKLIST - OBSERVATION

Observations	5	0	Comments	cc
8. *Appropriate Play for Five Minutes				29
*Claim and Defend Possessions:				
9. a. Physically				30
b. Verbally				31
10. *Independent Play 20 Minutes				32
11. *Takes Turns and Share				33
12. *Use Props in Dramatic Play				34
13. *Dress-up and Pretend				35
14. *Play Organized Games				36
15. *Preferred Playmate				37
Personal Information				
16. *Tells Age				38
17. *Tells				
a. first name				39
b. last name				40
18. *Name City, Street				41

APPENDIX 3

SPECIFIC INAPPROPRIATE BEHAVIOR CHECKLIST

Inappropriate Verbal Behavior	Definition	0	1	2	Comments	
*04. Insults, Threatens, Swears	Subject displays undue vocal or verbal feelings at approach of staff or in answer to staff or peer contact. Physical aggression is absent here. May also express such feelings by means of a threatening facial expression at approach of peers or staff.					_16
*05. Lies	Subject engages in excessive lying either in relation to his/her activities or in relation to other persons activities. Subject may gesture to indicate a false answer or lie, example, when asked if he/she has done something and he/she nods "no" when the answer should have been "yes".					_17
*06. Bosses	Subject engages in excessive bossing of peers either vocally or using gesture, example, telling others to do something or gesture with finger indicating subject requires the peer to do something.					_18

SPECIFIC INAPPROPRIATE BEHAVIOR CHECKLIST

Inappropriate Verbal Behavior	Definition	0	1	2	Comments	
*07. Inappropriate Non-directed Vocalizations	The subject forms words, word combinations or simple or complex sentences which are not directed to others. The behaviors may be demonstrated in the presence of others but without precipitating events. These include: 1) muttering to self example: says "cat" when no cat present 2) repetitious word(s) or sounds continually eg. "hi, hi, hi" "a, a, a"					19
*08. Inappropriate Directed Vocalizations	The subject responds with 1) inarticulate indistinguishable speech (aide may understand but rater must score 0, 1, 2 if she does not understand) 2) repetition or echolalic speech					20
Inappropriate Physical Behavior *09. Abuses Others (a) Responds Negatively	Subject responds to contact with harmful or potentially harmful behavior. Example, striking out, scratching, biting, etc.					21

45

SPECIFIC INAPPROPRIATE BEHAVIOR CHECKLIST

Inappropriate Physical Behavior	Definition	0	1	2	Comments	
b) Initiates Aggression	Subject initiates harmful or potentially harmful behavior towards others.					–
*10. Throws Objects	Subject throws toys or objects. He may aggress against other objects, example, tip over chair, pounding toys on floor, etc.					_22
*11. Tears, Breaks	Subject becomes destructive with or without any precipitating factor. He may aggress against objects, example, tip over chair, pounding toys on floor, rip books, tear clothes, etc.					_23
*12. Inappropriate Gestures	Subject displays excessive annoying gestures towards approaching staff or peers, example, sticking out tongue, spitting. Subject engages in excessive non-functional facial expressions. This does not apply when subject is expressing feelings, example, happiness, dislike, etc.					_24

SPECIFIC INAPPROPRIATE BEHAVIOR CHECKLIST

Inappropriate Physical Behavior	Definition	0	1	2	Comments	
*13. Tantrums	Subject exhibits spontaneous temper tantrums for no apparent reason. May be because of some unaccountable change in mood or subject exhibits excessive temper tantrums because of an overreaction to an event eg. a broken toy, denial, lack of attention, or when required by aide or staff to do something.					25
*14. Leaves Assigned Area	Subject continually leaves assigned area, example, during teaching time, eating time, toiletting.					26
*15. Mouths Objects	Subject excessively places not edible material into mouth.					27

SPECIFIC INAPPROPRIATE BEHAVIOR CHECKLIST

Inappropriate Physical Behavior	Definition	0	1	2	Comments	
*16. Removes Clothing Inappropriately	Subject removes clothing when not requested or at inappropriate time, example, other time than bed-time, etc.					_28
*17. Inappropriate Treatment of Excretions	Subject inappropriately handles excretions, example, eating, smearing, hiding.					_29
*18. Self-Stimulatory Behavior						_30
_____						
_____						

SPECIFIC INAPPROPRIATE BEHAVIOR CHECKLIST

Inappropriate Physical Behavior	Definition	0	1	2	Comments	
*19. Self-Mutilation						31

Rater Code: 80

APPENDIX 4

RECEPTIVE COMMUNICATION SKILLS PRE-POST ANALYSIS OF NUMBER OF ITEMS TESTED, PASSED AND RATIO ACROSS ASSESSMENTS

At the Time of Ass. #1	Ass #	Mean Ranks			Chi-Square	d.f.	Significance
		No. Tested	No. Passed	Ratio			
Treatment Group Mean Age: 12.7 years Range: 5-21	1 2 3	1.17 2.33 2.50			23.90	2	$p < .001$
	1 2 3		1.30 2.22 2.48		17.48	2	$p < .001$
	1 2 3			1.70 2.09 2.22	3.40	2	N.S.
Control Group Mean Age: 12.2 years Range: 5-22	1 2 3 4	1.42 1.83 2.75			11.17	2	$p < .01$
	1 2 3 4		1.46 1.75 2.79		11.80	2	$p < .01$
	1 2 3 4			2.13 1.79 2.08	.80	2	N.S.

EXPRESSIVE COMMUNICATION SKILLS PRE-POST ANALYSIS OF NUMBER OF ITEMS TESTED, PASSED, RATIO ACROSS ASSESSMENTS

At the Time of Ass. #1	Ass #	Mean Ranks			Chi-Square	d.f.	Significance
		No. Tested	No. Passed	Ratio			
Treatment Group Mean Age: 12.7 years Range: 5-21	1 2 3	1.52 2.15 2.33			8.23	2	p < .05
	1 2 3		1.39 2.26 2.35		12.87	2	p < .01
	1 2 3			1.50 2.24 2.26	8.63	2	p < .05
Control Group Mean Age: 12.7 years Range: 5-22	1 2 3 4	1.42 2.13 2.46			6.80	2	p < .05
	1 2 3 4		1.54 1.83 2.63		7.54	2	p < .05
	1 2 3 4			1.67 1.83 2.50	4.67	2	N.S.

PRIMARY PRE-ACADEMIC SKILLS PRE-POST ANALYSIS OF NUMBER OF ITEMS TESTED, PASSED, RATIO ACROSS ASSESSMENTS

At the Time of Ass. #1	Ass #	Mean Ranks			Chi-Square	d.f.	Significance
		No. Tested	No. Passed	Ratio			
Treatment Group Mean Age: 12.7 years Range: 5-21	1 2 3	1.72 2.37 1.91			5.15	2	N.S.
	1 2 3		1.26 2.11 2.63		21.98	2	$p < .001$
	1 2 3			1.54 1.98 2.48	10.07	2	$p < .01$
Control Group Mean Age: 12.2 years Range: 5-22	1 2 3 4	1.83 1.83 2.33			2.00	2	N.S.
	1 2 3 4		1.67 1.79 2.54		5.37	2	N.S.
	1 2 3 4			1.75 1.83 2.42	3.17	2	N.S.

ADVANCED PRE-ACADEMIC SKILLS PRE-POST ANALYSIS OF NUMBER OF ITEMS TESTED, PASSED, RATIO ACROSS ASSESSMENTS

At the Time of Ass. #1	Ass #	Mean Ranks			Chi-Square	d.f.	Significance
		No. Tested	No. Passed	Ratio			
Treatment Group	1	1.50			8.67	2	$p < .05$
	2	2.28					
Mean Age:	3	2.22					
12.7 years	1		1.09		28.76	2	$p < .001$
	2		2.46				
Range:	3		2.46				
5-21	1			1.13	26.17	2	$p < .001$
	2			2.39			
	3			2.48			
Control Group	1	1.96			.13	2	N.S.
	2	2.08					
Mean Age:	3	1.96					
	4						
12.2 years	1		1.88		1.13	2	N.S.
	2		1.88				
Range:	3		2.25				
5-22	4						
	1			2.13	1.54	2	N.S.
	2			2.17			
	3			1.71			
	4						

PRIMARY GROSS MOTOR SKILLS PRE-POST ANALYSIS OF NUMBER OF ITEMS TESTED, PASSED, RATIO ACROSS ASSESSMENTS

At the Time of Ass. #1	Ass #	Mean Ranks: No. Tested	Mean Ranks: No. Passed	Mean Ranks: Ratio	Chi-Square	d.f.	Significance
Treatment Group Mean Age: 12.7 years Range: 5-21	1 2 3	2.17 1.89 1.93			1.06	2	N.S.
	1 2 3		1.22 2.39 2.39		21.13		p < .001
	1 2 3			1.17 2.43 2.39	23.57	2	p < .001
Control Group Mean Age: 12.2 years Range: 5-22	1 2 3 4	1.83 1.75 2.42			3.16	2	N.S.
	1 2 3 4		1.79 1.50 2.71		9.54	2	p < .01
	1 2 3 4			1.88 2.04 2.08	.29	2	N.S.

AVANCED GROSS MOTOR SKILLS PRE-POST ANALYSIS OF NUMBER OF ITEMS TESTED, PASSED, RATIO ACROSS ASSESSMENTS

At the Time of Ass. #1	Ass #	Mean Ranks			Chi-Square	d.f.	Significance
		No. Tested	No. Passed	Ratio			
Treatment Group Mean Age: 12.7 years Range: 2	1 2 3	1.52 1.78 2.70			17.48	2	p < .001
	1 2 3		1.04 2.50 2.46		31.59	2	p < .001
	1 2 3			1.00 2.89 2.11	41.54	2	p < .001
Control Group Mean Age: 12 years Range: 5	1 2 3 4	2.21 1.96 1.83			.88	2	N.S.
	1 2 3 4		2.04 2.04 1.92		.12	2	N.S.
	1 2 3 4			2.08 1.92 2.00	.17	2	N.S.

SELF-HELP SKILLS PRE-POST ANALYSIS OF NUMBER OF ITEMS TESTED, PASSED, RATIO ACROSS ASSESSMENTS

At the Time of Ass. #1	Ass #	Mean Ranks			Chi-Square	d.f.	Significance
		No. Tested	No. Passed	Ratio			
Treatment Group Mean Age: 12.7 years Range: 5-21	1 2 3	1.52 1.78 2.70			17.48	2	$p < .001$
	1 2 3		1.35 2.04 2.61		18.34	2	$p < .001$
	1 2 3			1.50 2.20 2.30	8	2	$p < .05$
Control Group Mean Age: 12.2 years Range: 5-22	1 2 3 4	1.79 1.71 2.50			4.54	2	N.S.
	1 2 3 4		1.33 2.42 2.25		8.17	2	$p < .05$
	1 2 3 4			1.58 1.83 2.58	6.50	2	$p < .05$

SOCIALIZATION SKILLS PRE-POST ANALYSIS OF NUMBER OF ITEMS TESTED, PASSED, RATIO ACROSS ASSESSMENTS

At the Time of Ass. #1	Ass #	Mean Ranks			Chi-Square	d.f.	Significance
		No. Tested	No. Passed	Ratio			
Treatment Group Mean Age: 12.7 years Range: 5-21	1 2 3	1.52 1.89 2.59			13.46	2	$p < .01$
	1 2 3		1.48 2.07 2.46		11.15	2	$p < .01$
	1 2 3			1.67 2.[illegible] 2.24	3.94	2	N.S.
Control Group Mean Age: 12.2 years Range: 5-22	1 2 3 4	1.17 1.92 2.92			18.50	2	$p < .001$
	1 2 3 4		1.75 1.58 2.67		8.17	2	$p < .05$
	1 2 3 4			2.17 1.42 2.42	6.50	2	$p < .05$