Developmental gains by children with special needs as a result of early intervention

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Developmental gains by children with special needs as a result of early intervention

Lambert, Connie Rose, M.S.
University of Nevada, Las Vegas, 1988
DEVELOPMENTAL GAINS BY CHILDREN
WITH SPECIAL NEEDS AS A
RESULT OF EARLY INTERVENTION

By
Connie Rose Lambert

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Early Childhood Education for the Handicapped Counseling, Educational Psychology & Foundations University of Nevada, Las Vegas June, 1988
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ABSTRACT

This study evaluated the developmental gains of sixteen handicapped children who attended an early intervention program at an urban university. The subjects ranged in age from twenty-four months to sixty-six months and included a variety of conditions. A holistic, non-categorical developmental approach was utilized for intervention specifically focusing on early childhood special education. Parental involvement was encouraged. The subjects were taught by graduate students enrolled in a personnel preparation masters degree program, and consultation support services, such as physical therapy and speech therapy, were provided. A pretest developmental score was determined in all areas of child development at program entry, and a posttest score was determined in the same areas in the Spring or when the child left the program. To account for maturational influences, a change in rate of development formula was applied to the developmental change data. Analysis of pretest and posttest differences demonstrated that individual children, subgroups of children based on conditions, and the group of children as a whole made significant developmental gains, mostly beyond the p<.001 level. The results of
this study indicated that handicapped children can progress above their expected developmental rate, and through a well organized program, significant developmental changes can occur.
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CHAPTER I

INTRODUCTION & REVIEW OF RESEARCH

Introduction

Many studies have been conducted to evaluate the developmental gains made by young children with special needs as a result of early intervention services (Kirk, 1958; Schweinhart, Berrueta-Clement, Barnett, Epstein, & Weikart, 1985; Schweinhart, & Weikart, 1981; Shearer & Shearer, 1972; Skeels & Dye, 1938; and Zigler, 1979). The results, however are quite varied and described in global terms. There is a need for greater precision and specificity when assessing changes that occur in specific functional areas of child development (Bricker & Sheehan, 1981; Edgar, McNulty, Gaetz, & Maddox, 1984; Fewell & Sandall, 1985; Hayden & Dmitriev, 1975; Oelwein, Fewell, & Pruess, 1985; Shapiro, Gordon, & Neiditch, 1972; Wolery & Dyk, 1985). This study is designed to investigate the impact of early intervention on the whole child with particular focus on the evaluation of developmental changes in the areas of expressive language, gross motor, fine motor, cognitive, self-help, and social/emotional skills.
The efficacy of early intervention has been a concern of professional educators (Bloom, 1964; Hunt, 1961; Kirk, 1958; Skeels & Dye, 1972; etc.) for quite some time. This concern, supported by various theories and research over an extended period of thirty to forty years led to the passage of the Handicapped Children's Early Education Assistance Act (Public Law 90-538) in 1968. After this passing of the law, the efforts have been intensified by early childhood educators to investigate the gains made by children as a result of receiving intervention and prevention services. Most of the research literature evaluating the gains made by children after receiving services over a period of two to three years has been published since 1972.

Many of the studies focused on only one or two areas of child development. For example, some studies focused on the gains made in the cognitive domain (Skeels & Dye, 1972), and others focused on gains made in the cognitive and social domains (Schweinhart et al., 1985; Schweinhart & Weikart, 1981; and Zigler, 1979). Some studies targeted infants (Fewell & Sandall, 1985) while others focused on preschool age children (Wolery & Dyk, 1985). Many times the results did not indicate precise gains made in all areas of child development.

Practitioners in the field of early childhood
education for the handicapped and working with young children have noticed that even severely handicapped children make gains not attributed to maturation. These gains may be very minute and not readily measurable by standardized assessment tools (Fewell & Sandall, 1985). This observation contributed to the initiation of this research study which would focus on the assessment of any change, however minute, in any or all areas of child development.

Through practical experience, it was also noted that some children with physical disorders are cognitively at age appropriate or even at an advanced level of functioning; but, the assessments made by professionals not familiar with handicapped children generally produce very low results. The low assessments impact children by labeling them mentally retarded. The common reasons for the low test results may be due to the inability of the assessing professional to test these children adequately; child's speech deficits; limited vocabulary; inability to comprehend complex directions; or the professional's inability to establish rapport for testing purposes. The results obtained from inaccurate assessment instruments and/or methodology have a strong potential to adversely effect the child who may be assigned a wrong label and placed in an inappropriate intervention setting.
As a professional in the field, this observation has caused concern and created the need to conduct a study in a setting which avoids labeling the child and which also takes into consideration gains made in all developmental areas.

This research is a study of sixteen young children whose special needs ranged from moderate to severe levels. Categorically these children were identified as hydrocephalic, cerebral palsy, cerebral atrophy, low social development, high cognitive development (giftedness), speech articulation difficulties, and developmentally delayed (at least five months delayed in four or more areas of development).

Comparisons were made of the functional ability of each child in all areas of development during the early stages of intervention with the assessments done in the same developmental areas at the end of intervention. Gains of each child in each area of development were statistically analyzed and were found to be significant in most cases (p<.05). The implications of this study are presented for further research involving a larger population of children, and recommendations are made for the benefit of early interventionists, parents, and researchers.
Statement of the Problem

In order to document the impact of early intervention on child gains in specific developmental areas, maturation needs to be removed as an influence effecting child change. Prediction indices, techniques that eliminate maturation as a source of change, assure that the evaluation is a more accurate assessment of child progress resulting from early intervention.

This study will: (1) focus on children with various handicapping conditions between the ages of twenty-four and sixty-six months; (2) focus on the whole child with particular emphasis on the evaluation of developmental changes of expressive language, gross motor, fine motor, cognitive, self-help, and social/emotional skills; and, (3) demonstrate gains made by individual children, subgroups of children, and the entire sample in each area of development. Additionally, the change in rate of development prediction index will be utilized to demonstrate gains made in each area of development independent of maturational influence.

Definition of Terms

1. Early Intervention: discovering problems and intervening before the child's development and learning are seriously, perhaps permanently, affected.
2. **Children with Special Needs**: children who demonstrate functional ability in specific areas of development that are significantly above or below age level criteria.

3. **Developmental Gains**: functional gains made in areas of development independent of maturational influences.

**Review of Research**

Children occupy differing positions along the age continuum, and because of individual potentialities, generalizations do not necessarily apply to every child. Hereditary and environmental factors work together to determine the individual's ability to profit from environmental stimulation. Although hereditary factors may have determined the capacity for profiting from environmental stimulation, environmental factors determine the extent of realization of potentialities (Ausubel, 1957). The review of literature presented below documents the change in developmental growth due to environmental manipulation and stimulation.

The following theorists support the notion of contiguous continuity, that the current behavior repertoire provides the foundation for the development of the next succeeding stage and so forth. Development is shaped between the child and the environment in a transactional
manner. On-going exchanges between the child and the environment create a reciprocal covariation, and it is difficult to attempt to separate the two. Early intervention is predicated on the belief "that early experience is instrumental on the child's future development" (Bricker, 1986, p. 16). Early experience is essential to later development because continuity exists between early and subsequent behavior. The belief in continuity is the basis for attempting to carry out early assessment for problem prevention and remediation.

In 1968, President Lyndon B. Johnson signed into law the Handicapped Children's Early Education Assistance Act (HCEEEAA) which became Public Law 90-538. This was the first time legislation was specifically directed at young children with special needs and was not attached to any other piece of legislation. P.L. 90-538 authorized the use of federal funds to establish a nationwide network of model demonstration programs for the early intervention and education of young children with special needs.

This review of research is divided into two sections: (1) studies conducted before 1968 that focus primarily on the social and cognitive developmental areas of environmentally deprived children, and (2) studies conducted after 1968 that provide research upon which to base programs, develop curriculum and techniques to
meet the needs of preschool children with special needs in all areas of development, and demonstrate the effectiveness of preschool programs through the implementation of evaluation techniques.

**Literature before 1968**

One of the first major studies in the field of Early Intervention was conducted by Skeels and Dye in 1938. Thirteen mentally retarded orphaned infants between the ages of 7 months and 30 months were transferred to an institution that would offer a higher degree of a one-to-one emotional relationship between the child and a mentally retarded adolescent female. A control group of twelve infants between the ages of eleven and twenty-one months that were initially more intelligent than the experimental group was left in a non-stimulating institutional environment. Both groups were tested with the 1922 Kuhlman Revision of the Binet for a pre-test score. Five to fifty-two months after the experiment began, with eighteen months being the average time in the program, both groups were tested once again. The experimental group showed a gain of 27.5 in IQ, from 64.3 to 91.8 while the control group decreased 26.2 from 86.7 to 60.5 (Skeels, 1966). The children in the experimental group were transferred to an adoptive home or returned
to the orphanage if the child showed normal mental development as measured by the tests.

A follow-up conducted twenty-one years later determined the developmental status of both groups based on educational level, adult occupation, and general socialization. All members of the experimental group were self-supporting, eleven were married, and nine had children. On the other hand in the contrast group, one died in adolescence in an institution, four were wards of institutions, 2 married, 1 divorced, and two females were sterilized in late adolescence. The mean education level for the experimental group was twelve years, four received one or more years of college, and all were professional or semi-professional people. The contrast group received a mean education of third grade, fifty percent were unemployed and of those that were employed, all were unskilled laborers (Skeels, 1966).

The 1938 Skeels & Dye study focused only on gains in the cognitive and social areas as demonstrated by personal performance. Skeels (1966) advocated that a change from mental retardation to normal intelligence in children of preschool age was possible in the absence of organic disease or physiological deficiencies by providing a more adequate psychological prescription. This study laid the foundation upon which the future early
intervention programs were built.

Twenty years later, Kirk (1958) conducted a study over a period of three years to determine the effects of preschool training on the social and mental development of young retarded children in an institution and in a community to determine whether mental and social development of educable mentally retarded children can be accelerated if given instruction between the ages of three and six in a preschool setting. Before admission to the study, the complete medical and social history on each child was taken, along with height and weight, and the test results from the 1937 Revision of the Stanford-Binet and Kuhlman Test of Mental Development. Additionally, the Vineland Test of Social Maturity was administered in which the initial information was obtained from the parents of the community group and the attendants of the institutional group. Eighty-one children were identified between the ages of three and six with IQs between 40 and 80.

The children comprised four groups: 28 in the community experimental group and 26 in the community contrast group; and 15 in the institutional experimental group and 12 in the institutional contrast group. All the children were comparable in terms of psychometric tests and chronological age. The community groups were
all from the same area while the institutional experimental and contrast groups were from different institutions because of the difficulty of locating the appropriate number of preschool children in the same institution. The community and institutional experimental groups attended preschool from 9:00 a.m. to 3:00 p.m. each day while the contrast groups received no preschool training. There was one teacher for every four children attending the preschool and materials and activities were adapted for each child.

Rating categories were established prior to the first testing and the children were categorized after the first test, after a year of preschool, and after a year of public school for a total of three testing sessions at approximately 4.5 years, 6.2 years, and 7.2 years of age. The six categories were: uneducable - IQ of less than 45 to 54 taking into consideration general behavior, language, and social maturity to indicate the possibility of educable; low educable - IQ between 55 and 64 also taking into consideration general behavior, language and social maturity; high educable - IQ between 65 and 74 and showing evidence of self-help skills; borderline - IQ between 75 and 84 and comparable development in other areas; low average - IQ between 85 and 94 and average development in other areas; and, average - IQ 95 or above
with development similar to children of the same age. Initially, the community children ranged from borderline to low average while the institutional children ranged from low to high educable.

After one year of preschool, the two preschool groups demonstrated accelerated growth (community: +11.2 on the Stanford-Binet, +8.7 on the Kuhlman, and + 9.3 on the Vineland; institutional: +8 on the Stanford-Binet, +11.2 on the Kuhlman, and +9.7 on the Vineland) while the community contrast group maintained the rate of growth (+.3 on the Stanford-Binet, +2.2 on the Kuhlman, and +2.6 on the Vineland), and the institutional contrast group declined (-7.2 on the Stanford-Binet, -2.5 on the Kuhlman, and -13.8 on the Vineland).

The last test was administered following the first grade or first year of special education. The community and institutional preschool groups basically retained their accelerated growth (community: +.6 on the Stanford-Binet, +.7 on the Kuhlman, and +2.2 on the Vineland; institutional: -1.8 on the Stanford-Binet, -1.4 on the Kuhlman, and +.8 on the Vineland) while the community contrast accelerated the rate of growth (+7.5 on the Stanford-Binet, +6.2 on the Kuhlman, and +8.5 on the Vineland), and the institutional contrast group maintained the declined rate (+.7 on the Stanford-Binet,
-1.3 on the Kuhlman, and +1.8 on the Vineland). Overall, the children attending preschool raised one to three rating categories.

The children were also divided into subcategories of organic disabilities (resulting from maternal rubella, cerebral palsy, Down's Syndrome) and non-organic disabilities (culturally deprived). There were seven organically disabled children in each preschool setting. Of these fourteen children, 50% improved one or two levels of functioning. Of the institutional preschool children, one non-organic child and five organic children were paroled. Of the remaining twenty-nine non-organic children 79% improved one or two levels.

The role of environment on development was studied by the examination of home conditions. Six conditions based on parental characteristics were identified: low education level, below average intelligence, dependency on social agencies or relatives, attitude to over protect or reject the child, low moral standards, and inadequate housing. A home was considered inadequate if there were problems in four or more areas, semi-adequate if there were problems in two to three areas, and adequate if there were no problem areas. Children were rated regarding degrees of stimulation change. Four children were taken out of inadequate homes and placed in foster homes where
they all significantly increased their developmental levels. Twelve of the children remained in psychosocially deprived homes and two-thirds increased their developmental level one or more classification levels while one-third retained their developmental level.

A theoretical rate of growth line was determined at the initial testing period as a basis of expected growth rate. The two experimental groups deviated upwards from this line and did not regress to the expected rate of development following the preschool period; the community contrast group followed the expected curve until they began the first grade or special education classes, and then they accelerated in rate of growth; and the institutional contrast group dropped below the expected rate of growth during the preschool year and after starting school. One explanation of the variability of the contrast groups was the child's environment. The community group had a greater chance of associating with higher functioning individuals (family and peers) than did the institutional group. "Within limits, the greater the changes in the environment, the greater the changes in the rate of growth" (Kirk, 1958, p.207). The accelerated maturation was attributed to the enriched environment, that is the improvement was possible and children could function at a higher rate if they received enrichment from the
environment.

The Kirk (1958) study demonstrated that for the both community groups and for the institutional experimental group, the preschool experiment was effective and influenced the accelerated rate of growth whether the child began school at four or six or anytime in between. The author maintained that the upper limits of development were genetically or organically determined, but the functional level or rate of development may have been accelerated or depressed by environment (Kirk, 1958). This study also showed that preschool training can displace the rate of development of mentally retarded children when compared to those who do not receive early training. Although, the Kirk (1958) study occurred twenty years following the Skeels and Dye (1938) study, similar findings were demonstrated; that is, an enriched environment can positively alter a child's rate of development. The evaluation focused on the areas of cognitive development measured by IQ scores and social development indicated by the ratings of parents, teachers, or attendants on the Vineland Test of Social Maturity. No other areas of child development were evaluated. This study demonstrated positive results, confirmed the findings of the Skeels & Dye (1938) research, and opened the door for further early intervention studies.
After years of research, Hunt (1961) reported the relationship of intelligence to experience. He looked at early experience and its effect on later problem solving capacity. He concluded that fixed intelligence and predetermined development were no longer tenable assumptions. Genetics determine the reaction range of functioning ability, whereas stimulation from the environment and the opportunity to interact with it can determine the rate of development and developmental outcomes. The effects of the environment during the early years of life should be most potent for changes in the intellectual structures and most rapid during the early months and years (Hunt, 1961). The negative effects of early experience could be eliminated with intervention as long as the effects were not too extreme or occurred over a long period of time. Early deficiencies could be eliminated through changes in the environment. If biological insults resulted in major disabilities, effective environmental stimulation could reduce the impact, but can not completely erase it. Hunt suggested that intelligence is not a fixed entity. In other words, he meant it is plastic and changeable. The enriching experiences in the environment at an early age can have positive effects on the child.

After summarizing available research and identifying
the stable characteristics of human growth and development, Bloom (1964) conducted a study to describe to what extent such characteristics are stabilized at what age and to determine the conditions under which this stability may be modified. Evaluation occurred through the summarization of repeated measurements and observation from longitudinal studies of children. He defined a stable characteristic as one that is consistent from one point of time to another - as from one year to another. An aspect of a stable characteristic is non-reversibility, that is the growth that has already occurred is not lost at a later time. For example: height, intelligence, academic achievement, and deep-seated personality traits. Through the comparison of longitudinal studies of children birth to twenty-one years of age to determine patterns of growth, he found consistency between the relationship of age to stable characteristics. The same individual was repeatedly measured at different points in his/her life, and through a comparison of measurements, it was noted that there was a period of rapid growth and development, usually in the early years, followed by periods of less and less rapid growth and development.

Bloom (1964) proposed that intelligence was predictable and could be graphically presented as a curve of development. He determined that fifty percent of
intelligence gained by the age of seventeen was achieved by the age of four and another thirty percent was gained in the following four years for a total of 80% of intelligence achieved by the age of seventeen occurring in the first eight years of life. He asserted that environment does influence change in a particular characteristic. The child has genetic potential, but direction is determined by the environment. Bloom concluded that the effect of the environment was the greatest during periods of rapid development (birth to five years of age) and steps to enhance the child's environment should be taken as early as possible.

Another study which supported the belief in early intervention was Perry Preschool. It began in 1962 in Ypsilanti, Michigan serving 123 black children living in poverty (Schweinhart, et al., 1985). The children included in the program were identified by their family's socioeconomic level, household head's level of employment, and ratio of rooms per person in the home. The preschool group was matched to a control group based on background characteristics: sex, age, IQ at project entry, family socioeconomic level, father's presence or absence, father's or mother's scholastic attainment, family welfare status, father's level of employment, household size, family size and birth order (Schweinhart & Weikart, 1981).
Fifty-eight children in the experimental group were assigned to the preschool in which the program emphasis was intellectual and social development. The children attended the preschool two and a half hours each morning Monday through Friday. The teachers made hour long home visits each week. The children's IQ derived from the Stanford-Binet Intelligence Test was between 60-90, and they demonstrated no handicapping conditions. During the first year a group of three and four year old children attended the preschool. For the next three years, a new group of three year old children were added for a total of five experimental and control groups.

Follow-up data was gathered when the children were nineteen years of age based on police records, school records, social service records, and personal interviews. The experimental group out performed the control group in the amount of education received (67% of the experimental group graduated from high school to 47% of the control group) and in employment (50% of the experimental group was still employed as compared to 32% of the control group). The rate of students having been arrested was 31% for the experimental and 51% for the control group. The experimental group spent less time in special education classes and had less students classified as mentally retarded; 35% of the control group
was classified mentally retarded to 15% of the experimental group (Schweinhart, et al., 1985).

The conclusion determined by the Perry Preschool study was that all children at risk of school failure for socioeconomic reasons could profit from one to two years of preschool and that future problems could be prevented or kept to a minimum. This study was also limited to child gains in the cognitive and social developmental areas and the gains were assessed after the children became adults.

The federal preschool program Head Start, created by the Economic Opportunity Act of 1964 as part of President Johnson's "War on Poverty", also demonstrated the effects of early intervention. It focused on providing social experiences commonly experienced by most children but unavailable to those from impoverished homes. The goal of Head Start was to bring about social competence in economically depressed and culturally competitive children and to include parental involvement to enable the family to improve their economic status and provide a favorable developmental environment for their children (Zigler, 1979). Social competence was described as the "ability to master appropriate formal concepts, to perform well in school, to stay out of trouble with the law, and to relate well to adults and other children" (Zigler,
The Follow Through Program, established in 1967, was designed to continue to build on cognitive and social gains made after one year in the Head Start program. Services were extended from three to five year old children to include older children in kindergarten and elementary school. The program provided nutritional and health care, social and psychological services, and special teaching assistance to children during the early years of elementary school (Zigler, 1979).

Initial results of the Head Start program were published in the 1968 Westinghouse Report which has been widely quoted as providing evidence that Head Start had no effect. In fact, after the data was reanalyzed by Campbell and Watts, it was concluded that the Westinghouse Report focused on the intellectual development of children with no regard to health, motivation, and social development; and that the program did show positive effects on the children and families involved (Zigler, 1979).

In 1974, a study by Abelson, Zigler, & DeBlasi compared children who attended Head Start and Follow Through with children who did not attend. Teacher ratings of fifty behavior characteristics were utilized when comparing first grade children. The Head Start children were rated higher in leadership, more self-confident,
persistent, and emotionally mature. Head Start graduates were more likely to create their own solutions to problems, less likely to imitate others, and more likely to discuss spontaneously what they were doing. Zigler (1979) reports, "Our data show that Head Start pupils in the Follow Through program verbalize as freely as their classmates from higher income families" (p.413).

Zigler (1979) reported that although Head Start has demonstrated immediate cognitive gains, these gains would not have been maintained if nothing else was done for the child. There was the potential for regression if educational services did not continue. The results of the Head Start programs were limited to cognitive gains measured by school performance and social gains determined by family and peer relationships rather than all aspects of child development.

Literature after 1968

The Portage Project (Shearer & Shearer, 1972) was funded by the Education for all Handicapped Act: P.L. 91-230. The Portage Project was a home teaching program which attempted to directly involve parents in the education of their multiply handicapped children by instructing parents what to teach, how and what to reinforce, and how to observe and record behaviors. The
study occurred during the 1970-72 school years and took place in the home, a natural setting for both the parents and their children. A home teacher provided instruction in the home one and a half hours per day, one day per week for a period of 9½ months. The teacher initially assessed the child to obtain objective data regarding developmental level and intellectual power using developmental scales and intelligence tests, which included: the Stanford-Binet Intelligence Test, Form L-M; the Cattell Infant Scale; the Peabody Picture Vocabulary Test; and, the Slossen Intelligence Test for Children and Adults. Each child was then provided with an individual curriculum based on his/her present functioning level.

The Portage Project staff developed an early childhood curriculum guide (Shearer & Shearer, 1972) that included a developmental checklist listing sequential behaviors from birth to five years of age and a set of curriculum cards which matched the 450 behaviors on the checklist. The developmental areas measured by the checklist were cognitive, language, self-help, motor and socialization skills. The checklist was utilized to pinpoint the child's baseline performance in all developmental areas, then the home teacher assigned goals to be achieved within one week. The task the child was to achieve was
demonstrated to the parent, and then the parents performed the task with the child. Directions on the activity chart could be followed by the parent throughout the week. The results were recorded during the week. The home teacher recorded post-baseline data the following week to verify the accuracy of the parent's recordings. If a task could not be achieved within one week, the teacher extended the task for another week or changed the task, going back to a prerequisite skill. Three to four tasks, on the average, were assigned each week with an average of 128 tasks per child being completed for the year with a 91% success rate. Formative evaluation was recorded by parents according to daily performance, and teachers recorded performance on a weekly basis. A complete summative evaluation using developmental scales and IQ tests was performed twice a year. The results demonstrated that children gained an average of 13 months growth in an eight month period.

Children randomly selected from Portage Project and from those receiving classroom instruction in programs for the culturally and economically disadvantaged participated in an experimental study. The Stanford-Binet Intelligence Test and the Alpern-Boll Developmental Skills Age Inventory were used as pretest and posttest measurements. Multiple analysis of covariance was used
to control for IQ, practice effect, and age. The greater gains made by the Portage Project children in all areas of mental age, IQ, language, academic development, and socialization were statistically significant as compared to the group receiving classroom instruction (Shearer & Shearer, 1972). Using the children as their own controls, the mean gain IQ scores on the Alpern-Boll Developmental Skills Age Inventory was 13.5 and the mean gain scores on the Stanford-Binet was 18.3 (both statistically significant at \( p < .01 \)).

The Portage Project demonstrated that parents could effectively teach their children and their children do and can learn. Follow-up data on children three months after the termination of the project showed no significant difference in scores which indicated that parents continued teaching their children even after teacher visits stopped. This holistic program directly involved the parents in the education of their child with special needs providing the parents with experience and seeing their child succeed, suggesting they were partially responsible for the progress of their child. This program focused on all areas of child development and showed gains in child performance when the child was compared against himself/herself, and when the child was compared to other children attending an early childhood program.
In another study, Shapiro, Gordon, & Neiditch (1977) documented changes in multiply handicapped children attending an inpatient, intensive education program in a rehabilitation center during 1970-72. The primary source of data was anecdotal records written by the child's teacher three times per week for each child from admission to discharge, approximately three months. Two teachers had the primary responsibility for the education programming and the writing of anecdotes. The parents were required to spend one full day each week involved in the child's education program. Over the two year period, twenty children ranging in age from 18 months to 36 months attended the Infant Program. Included were disabilities of spina bifida and cerebral palsy. The socioeconomic levels of the families varied.

Pretest data was obtained after the child had been in the program approximately two weeks and the post data was gathered after the child had reached his/her peak, normally two to three weeks before discharge. Following the child's discharge, six anecdotal logs were randomly selected and subjected to independent coding by two members of the search team to determine interrater reliability. Eight dimensions of behavior were coded in two major categories: hierarchical - Interaction with Materials, Social Responsiveness, Expressive Language, and Awareness
of Environment; and, non-hierarchical - Expression of Affect, Gross Motor, Fine Motor, and Sensory Responsiveness. These dimensions coincided with the areas of child development.

The analysis of data included dividing the coded logs into time periods, then coding the frequency of behavior in each dimension and converting it into mean frequencies per episode of behavior. The mean frequencies per hierarchical dimensions were converted into weighted means to reflect the levels of functioning within the total counts. The validity of the findings were tested in comparison with the clinical impressions of the education staff regarding rankings of the children. The application of the Spearman Rank Order Test indicated significant correlations (p < .01) in all comparisons except the Awareness of Environment. Pretest and posttest score differences were examined in order to determine if the group as a whole was more responsive upon discharge, and the results indicated they were more responsive and functioned at a higher level in all hierarchical dimensions than at pretest (Shapiro, Gordon, & Neiditch, 1977).

All findings were statistically significant (p < .01) except for Interaction with Materials. In the non-hierarchical dimension, increases occurred but Gross Motor was the only dimension where statistical significance
was noted. The results also indicated the children were significantly more independent at the end of their stay. When the children were ranked and correlated regarding their pretest and posttest standing in the group, results indicated that although the child's level of functioning changed, their relative standing within the group remained the same (Shapiro, Gordon, & Neiditch, 1977).

Although the Shapiro, Gordon, & Neiditch (1977) study demonstrated gains in all developmental areas, the validity of the results may be questioned because members of the research team served as raters for the interrater reliability check and no coefficient was offered. Also, the total number of logs per child was not given, so the reader could not ascertain whether choosing six logs for the interrater check was a reliable number. This study raised questions regarding the method utilized to evaluate child change and whether or not it was a reliable or valid method for statistical conclusions, but definitely demonstrated that children made gains based on clinical judgments of teachers who provided intervention services and kept anecdotal records.

In 1972, the University of Washington began an outreach early intervention program. This program was conducted at eleven sites which served 164 handicapped children. Ninety-eight males and sixty-six females ranging
in age from eleven months to fourteen years of age participated in the study with mentally retarded as the major handicapping condition. Sixty percent of the children were between the ages of three and six years of age. The programs were located in public schools, private school, developmental centers, and a demonstration center at the University. Parents attended class at least once a week with their child where they were trained to use techniques and procedures utilized in class at home. Posttest results were derived from the Developmental Sequence Performance Inventory (DSPI) three to nine months following the pretest.

The DSPI was developed by program staff from standardized tests and developmental checklists. It consisted of seven levels of checklists in all developmental areas and could be used with children from birth to eight years of age. The results were based on the child's predicted performance. The predicted performance age (PPA) is obtained by "calculating the child's previous rate of development per month, multiplying it by the months of intervention, and adding the results to the child's entry performance age" (Oelwein, Fewell, & Pruess, 1985, p. 84).

The results were statistically significant (p<.05) in most areas of development. Mean scores of Posttest Performance Age increased .95 months beyond the PPA in
gross motor, 1.4 in fine motor, 2.2 in cognitive, and 2.46 in communication. The social score increased .74 but was not significantly higher.

The purpose of this study was to look for the efficacy of the program across settings, handicapping conditions, and ages of the children; therefore, the results from all settings including all children were lumped together for one conclusion. The results of the intervention program may have been different had the children been placed within specific groups based on age and/or handicapping condition. The DSPI is not a standardized instrument. It is teacher administered and therefore more likely to be subject to observer bias. It is also used as a basis for curriculum instruction, therefore the pupils are taught to the test.

The Oelwein, Fewell, & Pruess (1985) study does not report the socioeconomic status of the student's families, describe the geographic areas in which the outreach sites were located, or mention the amount of time the children spent receiving direct instruction. Despite all the limitations, the outreach program does demonstrate positive outcomes.

Another study by Hayden & Dmitriev (1975) was conducted at the University of Washington. The study was conducted at the University of Washington's Model Preschool Center to determine the extent to which children
with Down's Syndrome could be trained for more active participation in society through a systematic program and bring Down Syndrome children close to normal development beginning with early stimulation. The children were initially assessed using the Denver Developmental Screening Test to determine strengths and weaknesses in physical, cognitive, and social developmental areas, and then specific developmental performance objectives were set for each child.

Forty-four children were enrolled in four different programs during the 1973-74 school year: fourteen children between the ages of five weeks and eighteen months were enrolled in the Infant Learning Class; nine children between the ages of eighteen months and three years were in the Early Preschool; twelve children between the ages of three and five years were in the Advanced Preschool; and, nine children between the ages of four and one half and six years were in the Kindergarten. Parents were given instruction to manage and supervise play activities, to prepare materials, and to observe and record behaviors. Parent/teacher conferences and parent meetings were scheduled once a quarter.

The Infant Learning Class met one per week with one or both parents and the child receiving thirty minutes of individualized training in early motor sensory development. The results for the Infant Training Class
indicated that most of the children were meeting or maintaining developmental objectives in motor, adaptive, personal-social, and language areas. Eleven of the children demonstrated a mean difference of one month between their CA and MA scores. Three of the children who were four to eighteen months behind in development enrolled in the program at a later time. Hayden & Dmitriev (1975) cited a 1972 study by Dicks-Mireaux that reported a mean lag of one year for twenty-one Down's Syndrome children whose CA was 19.5 months, who remained at home and did not attend a learning program. These findings were supported by the developmental lag of the children that joined the program late.

The Early and Advanced Preschools were assessed in the areas of physical, mental, and social development. All the children in the Early Preschool mastered the designated tasks in Self-Help (80-99%), and gross motor, language, and concept development, depending on the task (39-100%). Due to the length of the study, six children were moved from the Early Preschool into the Advanced Preschool where ten of the children reached criterion in the stated objectives. Thirteen of eighteen were toilet trained, nine rode tricycles independently, and in the reading program, those who attended for four quarters could read thirty words. When the Peabody Picture Vocabulary Test was administered, the difference between
pretest and posttest scores was 7.8 with a score of 75.2 in 1972 and 83 in 1973. There was no data to report for the Kindergarten Program because it had only been operating a short time. Hayden and Dmitriev (1975) reported that they anticipated fulfilling the specified objectives by the end of the school year.

The gains in the program were noted through systematic observation, continuous measurement to determine student progress, and recorded amount of parental involvement. The children were assessed in all areas of development and the results demonstrated that those receiving services made or maintained progress. Success was measured by objective completion or task mastery.

A similar study was conducted by Bricker & Sheehan (1981) in joint effort with the Center on Human Development, University of Oregon; Mental Retardation/Developmental Disability Office, State of Oregon; and, the Eugene Public Schools, Eugene, Oregon. The program was non-categorical and also served children at risk for future problems and non-handicapped. Sixty-three children and their families participated in the study. The children ranged in age from five to sixty-nine months with a mean age of 36.5 months. Twenty-nine females and thirty four males participated in the study. Family demographics indicated 89% of the parents finished high school or college.
The program consisted of two units: home intervention and center-based. The classroom focused on all domains of child development in a structured environment while the home unit delivered educational services in collaboration with the parents in the home setting. The home program focused on assisting the parents in developing skills necessary for becoming effective change agents for their child. The parents were involved in the classroom as well as attended monthly parent meetings.

Pretest scores were gathered in the Fall and posttest scores were taken in the Spring after the children had been enrolled in the program at least seven months. The subcategories normal, at-risk, mildly, moderately, and severely handicapped were also used.

Children that were less than thirty months of age at program entry were assessed using the Bayley Scale of Infant Development. The areas of psychomotor age equivalent (PAE) and mental age equivalent (MAE) were analyzed for each child. The mean of PAE pretest and posttest scores increased from 8.9 to 12.2 while the mean of the MAE increased from 7.5 to 11. The authors utilized procedures suggested by Abt Associates (1977) and Tallmadge (1977) which compared pretest and posttest scores using the pooled standard deviations. If the difference between the pretest and posttest scores exceeded .25 of the pooled standard deviations, they were considered educationally
significant (Bricker & Sheehan, 1981). Educational significance is utilized to describe the impact of the individualized educational program. A comparison of pretest and posttest developmental quotient (DQ) scores showed no statistical or educational significance. Bricker & Sheehan reported that the lack of significance was not unexpected because "using developmental quotient (DQ) with handicapped children is problematic because handicapped children are increasingly penalized as the population diverges from the normative sample" (Bricker & Sheehan, 1981, p.17). The subcategory of mildly handicapped demonstrated educationally significant differences using a one tailed t-test for correlated means (p<.001).

The McCarthy Scales of Children's Abilities was utilized for children over thirty months of age at program entry. Comparisons of the General Cognitive Index (GCI) and mental age (MA) were utilized and significant differences were noted (p<.001). The GCI increased 5.9 from 66.9 to 72.8 while the MA gain was 6.9 from 31.5 to 38.4 which was educationally significant. In the subgroups, all groups were statistically and educationally significant (p<.001) except for the severely handicapped children.

The Student Progress Record (SPR) and Uniform Performance Assessment System (UPAS) were utilized to
determine the programmatic impact on the children. These are criterion referenced measurements. All the results on the SPR were statistically significant (p<.001) regarding the mean number of items passed. The UPAS results were also statistically and educationally significant (p<.001).

Overall, using a correlated t-test, the mildly handicapped children made gains of 88% statistically significant and 100% educationally significant; the moderately handicapped children were 81% statistically significant and 100% educationally significant; and, the severely handicapped were 62% statistically significant and 75% educationally significant. This holistic program with parental involvement utilized two norm referenced tools and two criterion referenced measures for the evaluation of demonstrated gains made by all children in all areas of development.

In 1985, Wolery & Dyk conducted a three year study of the Infant/Parent Training and Early Childhood Development Program. The program served children birth to five years of age. It was set up in a three tier fashion: two levels of center-based services, and a parent consultation service for families with infants. The children were diagnosed as having low incidences of handicapping conditions and the cognitive handicaps ranged from mild to moderate. Thirty-four children (twenty-one
males and thirteen females) were utilized in this study. The children in the Infant/Parent Training Program were seen once a week, children in Level I of the center-based program attended class twice a week with a parent attending with them once a week, and the children in Level II attended the center-based program five days a week with the parent attending one to two times per month. Parent participation decreased in frequency as the child grew older while the child participation increased, thus providing a smooth transition into the public school system (Wolery & Dyk, 1985). Intervention consisted of education and therapeutic plans developed by a transdisciplinary team and these plans were based on assessment data. Each level of intervention received similar assessments, educational plans, and implementation of services which only differed in the amount of intervention received.

The children were all screened with the Developmental Profile II and evaluated with the Early Learning Accomplishment Profile, and/or the Learning Accomplishment Profile-Diagnostic. Children were evaluated at mid year, and then tested in the Spring for the posttest results.

The results were determined by evaluating the child's developmental rate and the Proportional Change Index (PCI) (Wolery, 1983). The PCI is the ratio between the rate of development at pretest and the rate of development during intervention with 1.0 indicating the rate of
development during intervention was identical to the rate of development prior to intervention. A score of less than one indicated the rate of development had decreased; and, a score of more than one indicated the rate of development had accelerated during intervention. (Wolery & Dyk, 1985). The developmental rates and developmental change data in all domains indicated that developmental rate at pretest was slower than developmental rate during intervention with PCI scores being above 1.0 in all but two cases, which were .76 and .84. Level II demonstrated the greatest amount of developmental change indicating that additional time in the center-based program produced greater change. Level II also achieved a greater number of objectives (59%) than did Level I (57.3%).

Wolery & Dyk (1985) analyzed PCI scores for each developmental area. The analysis indicated that children in Level II had PCI scores greater than 1.0 in more developmental areas per child than did the children in Level I (Wolery & Dyk, 1985). This was the only statement in the article regarding assessing the children in all developmental areas and the only statement that stated results of the holistic approach. No other information was offered detailing specific gains in specific developmental areas.

Variability between children across all levels of development was noted. The authors proposed that this
variability may be due to handicapping condition, types of emphasis of intervention, or outside factors such as individual therapy or prior educational services received. This study focused on the evaluation of child gains in a non-categorical program utilizing the PCI as a determinant of specific gains resulting from intervention.

Another study by Fewell & Sandall (1985) was conducted to compare procedures for analyzing developmental outcomes of early intervention programs. Three different measures were applied to the same sample group with different conclusions regarding program effectiveness being drawn from each analysis. Twenty-nine handicapped infants who had been enrolled in the Computer-Assisted Program (CAP) located in the Experimental Education Unit at the University of Washington for at least twelve months were utilized for this study. All the children were considered to be developmentally delayed using criteria set by Washington state (25% or more delay in two or more domains). The mean age at entry was five months of age, and the sample included twenty-one males and eight females. Twenty children were enrolled in the center-based program and attended class four days per week for two hours per day while nine children were in the field based program in rural areas where services were implemented by the parents on an individually planned, computer based program. The field based families were monitored by university
staff members via telephone, letters, and quarterly evaluations of the child's progress completed by the parents.

Pretest and posttest scores were compiled using the Early Intervention Developmental Profile which is a criterion referenced developmental scale that measures performance in all developmental domains. Data was analyzed in the following domains: perceptual/fine motor, cognitive, language, selfcare, and gross motor; social scores were dropped because the staff did not consider them to be valid measures. The data was analyzed as: developmental age equivalents (DA) that are based on the assumption that chronological age will be equal to developmental or mental age if the learning quotient is 100; developmental quotients (DQ) which are the ratio of developmental age to chronological age (DA/CA) multiplied by 100 to eliminate the decimal; and prediction indices which examine developmental change in relation to time in intervention (Fewell & Sandall, 1986).

When analyzing the results, the DA data indicated significant differences favoring early intervention. Over a period of twelve months children gained from 7.12 to 9.03 months across five developmental domains. DQ scores dropped one to thirty-four points after intervention suggesting the program had negative effects on the child. Significant decreases were noted in cognitive, language,
and selfcare areas. Prediction coefficient indices also indicated negative scores; all the scores were negative, reflecting a failure to maintain or accelerate the entry performance. The most obvious flaw in utilizing only the DA score is the failure to consider the impact of maturity over time; using only DQ scores may increasingly penalize the handicapped infant as they grow older, and the use of prediction indices also do not appear to be the appropriate analysis procedure during infancy.

It is unlikely that a well organized intervention program would have a negative effect on children, but there may be serious problems utilizing developmental tests with infants. A study by Oelwein (1985) with older handicapped children (mean age of 57 months at entry) reported significant gains in four of five developmental areas suggesting that the "older population was more stable and considerably lower on the average at entry" (Fewell & Sandall, 1986, p.96). The authors suggested that to assess developmental gains by infants more effectively, programs need to consider gains made in the area of parent training, maintenance of the child's current level of development with no regression, and utilization of more sensitive scoring systems with infants, such as methods that allow for credit for partial responses to an item or testing to limits. As a final note, the authors suggested that programs expand their child assessment
approaches to measure elements of intervention that are not addressed with the narrow perspective of developmental tests.

The Fewell & Sandall (1986) study focused on evaluation techniques utilized with infants in an early intervention program. All areas of development were measured at pretest and posttest and subjected to three methods of evaluation that demonstrated the inability to accurately measure developmental gains by infants using developmental testing techniques.

Edgar, McNulty, Gaetz, & Maddox (1984) demonstrated the effectiveness of preschool programs for the handicapped by determining the current placement of preschool graduates. Data was collected in Colorado for the school year 1981-82, and similar data was collected in Washington state for the school year 1982-83. Each state utilized eleven school districts with active preschool programs. Data was collected within each district by local staff who were asked to collect information on current placement and handicapping condition of their graduates.

Results of the 1,775 children in Colorado showed that 31.4% were in regular education classes, 37.1% were in regular classrooms with support personnel (for example: consultants or resource room ancillaries), and 31.4% were in self-contained classes. When broken into subgroups by handicapping condition, the data for Colorado
demonstrated that of the severely handicapped children, 12% were in regular classrooms, 7% in regular classrooms with support personnel, and 81% were in self-contained classes; of the mildly handicapped children, 38% were in regular classrooms, 33% were in regular classes with support personnel while 30% were in self-contained classrooms.

The data from the Washington state study demonstrated similar results when the placement of 977 graduates were analyzed. Sixteen percent of the total number of children were in regular classrooms, 19% in classrooms with support personnel, and 65% were in self-contained classrooms. The discrepancy in the percentage of graduates in self-contained classrooms in the two states (31.4% in Colorado and 65% in Washington) is believed to be that the options and reimbursement methods may effect placement (Edgar et al., 1984). Washington's funding program prior to 1980 tended to reward self-contained classroom placement.

In the subcategory of severely handicapped, 8% were in regular classrooms, 12% were in regular classrooms with support personnel, and 82% were in self-contained classrooms. In the subcategory of mildly handicapped, 22% were in regular classrooms, 24% in classrooms with support personnel, and 54% were in self-contained classrooms.

Conclusions drawn across all twenty-two school
districts in both states showed that of the severely handicapped graduates, 80% were in self-contained classrooms, but 15-20 were educated in regular classrooms. The importance of first placement was also noted. For example, in the Washington state sample, 87% of graduates initially placed in regular classrooms were still in regular classes, 74% initially placed in regular classrooms with support stayed in classrooms with support, and 91% placed in the self-contained classrooms remained in self-contained classes.

The results of the Edgar, et al., (1984) study suggest that children with handicapping conditions at the preschool age who attend special education preschool programs are mainstreamed into regular education classes. Although this study looked at child placement as an index of program effectiveness instead of gains made in specific areas of child development, it is one significant index of the effectiveness of early intervention.

**Summary**

All the studies reviewed above related to early intervention document positive changes in the areas of child development, and that through environmental manipulation and stimulation, developmental growth of children with various genetic or environmental handicapping conditions does occur.
Hunt (1961) and Bloom (1964) concurred on the importance of early intervention. Hunt (1961) concluded that intelligence was plastic and malleable and that changes in the environment at an early age could have positive effects. Bloom (1964) proposed that fifty percent of intelligence gained by the age of seventeen was achieved by the age of four, another thirty percent was achieved by the age of eight for a total of eighty percent of intelligence gained by the age of seventeen being achieved by eight years of age.

Most of the early intervention studies focused primarily on the cognitive and social areas of development. (Kirk, 1958; Schweinhart, et al., 1985; Schweinhart & Weikart, 1981; Skeels & Dye, 1938; and Zigler, 1979). Studies conducted by Skeels & Dye (1938), Kirk (1958), Schweinhart et al. (1985), Schweinhart & Weikart (1981), and Zigler (1979) utilized children that were environmentally at-risk for future problems. The conclusions of all four studies concluded that an enriched environment could positively alter a child's rate of development.

Following the passage of P.L. 90-538 in 1968, programs were established that focused on all areas of child development. Gains of children in these programs were determined in all areas through the pretest and posttest assessments of individual children (Bricker & Sheehan,
by using children as their own control.

Oelwein, Fewell, & Pruess (1972) utilized a Predicted Performance score and Wolery & Dyk (1985) used the Proportional Change Index to account for the influence of maturation on developmental growth. A prediction index is used in this study to determine the impact of early intervention.

Developmental gains reported in the Hayden & Dmitriev (1975) study were noted through systematic observation, continuous measurement to determine student progress, and recorded amount of parental involvement. In this study, success is also measured by objective completion.

The Portage Project (Shearer & Shearer, 1972) demonstrated the effectiveness of parental involvement. In the study, parents were effective in promoting developmental change in their child. Most of the studies conducted after the passage of P.L. 90-538 included parental involvement as an important program component.

Fewell & Sandall, (1985) demonstrated the difficulty of using developmental tests with infants. The children utilized in this study are older, and using the prediction index to account for maturational influences, the effectiveness of early intervention should be supported.

Edgar, et al., (1984) showed the effectiveness of preschool programs for handicapped children by determining the current placement of preschool graduates. The
importance of first placement was also noted.

All the studies demonstrated the effectiveness of early intervention with young children with genetic problems or environmentally at-risk for future difficulties. Although the studies may have utilized different methods of determining developmental growth, each demonstrated successful developmental gains.

**Hypotheses**

1. Each child will make gains in each area of child development.
   1.1 In the expressive language skills area.
   1.2 In the gross motor skills area.
   1.3 In the fine motor skills area.
   1.4 In the cognitive development skills area.
   1.5 In the self-help skills area.
   1.6 In the social/emotional skills area.

2. Each subgroup will make gains in each area of child development.
   2.1 Subgroup of children with physically handicapping conditions will make gains in each area of child development.
      2.1a In the expressive language skills area.
      2.1b In the gross motor skills area.
      2.1c In the fine motor skills area.
      2.1d In the cognitive development skills area.
2.1e In the self-help skills area.
2.1f In the social/emotional skills area.

2.2 Subgroup of developmentally delayed children (at least five months delayed in four or more areas) will make gains in each area of child development.
2.2a In the expressive language skills area.
2.2b In the gross motor skills area.
2.2c In the fine motor skills area.
2.2d In the cognitive development skills area.
2.2e In the self-help skills area.
2.2f In the social/emotional skills area.

2.3 Subgroup of children functioning at or below age level in the social/emotional skills area will make gains in all areas of child development.
2.3a In the expressive language skills area.
2.3b In the gross motor skills area.
2.3c In the fine motor skills area.
2.3d In the cognitive development skills area.
2.3e In the self-help skills area.
2.3f In the social/emotional skills area.

3. Children as a whole group will make gains in each area of child development.
3.1 In the expressive language skills area.
3.2 In the gross motor skills area.
3.3 In the fine motor skills area.
3.4 In the cognitive development skills area.

3.5 In the self-help skills area.

3.6 In the social/emotional skills area.
CHAPTER II

METHODOLOGY & RESULTS

Setting

This study was conducted in a model demonstration early intervention program at an urban university. The center is associated with a graduate level personnel preparation program that readies master's level specialists to work with children with special needs from birth to eight years of age. Gaining intensive practical experience along with theoretical coursework is an essential component of this graduate program. Graduate students are required to work directly with children and families. Therefore, they serve as primary teachers while simultaneously enrolled in related classes, that is, those dealing in assessment, strategy formation, curriculum development, parenting, and human growth and development.

The program focuses on child development gains obtained through an individualized, non-categorical, and transdisciplinary approach. A variety of children with mild to severe handicapping conditions attend the program. The mixed population provides multiple experiences for the graduate students as well as a family-like atmosphere for the children by including older and younger children.
Children attend the center three hours per day (either morning or afternoon session) four days per week. Each class has a minimum of two teachers, a maximum of ten children, and volunteers from several related undergraduate programs, that is, social work, special education, and nursing. There is generally a ratio of one adult to three children.

The team teaching approach is more effective in a program for young children with special needs. When one teacher is required to leave the room (for example, take a child to the bathroom), a qualified teacher remains in the classroom. Also because of the mixed population, the children can be grouped according to their functional abilities and each group is instructed by qualified personnel.

This program follows the requirements of Public Law 94-142, and hence of P.L. 99-457: Education of the Handicapped Act Amendments of 1986, which requires that each child have an Individualized Educational Plans (IEP) based on the child's functional level that is continuously monitored and updated. IEPs are written for each child detailing individual objectives and goals (see sample in Appendix A).

Children are assessed upon program entry as to their functioning ability in all areas of development. The classroom teacher uses formal assessment instrument and
direct observation to determine the child's developmental status. This developmental score indicates the child's pretest functioning abilities. Daily anecdotal records are written for each child to document individual gains, and IEP objectives and goals are charted daily to plot the child's progress pattern (see sample in Appendix B). At the end of the school year, another formal assessment is conducted to provide posttest data. The pretest and posttest developmental levels are compared to determine overall developmental gains.

All developmental skill areas are included daily in lesson plans. The skills are taught during guided/free play, small and large group activities, and individual attention (see sample in Appendix C). A speech therapist and an occupational therapist are contracted for screening and consultation purposes. The teacher attends the therapy session with the child, prepares a report for the child's records, and incorporates recommendations into daily lesson plans. The teacher and therapist meet with the parent(s) to discuss screening results and to offer suggestions for working with the child.

Parent involvement in the classroom is encouraged, and parents are required to attend a monthly parent meeting. These meetings focus on child development and provide knowledge related to their child's disability. Also, parenting techniques, current legislation with
reference to child and family rights, and local and national support groups, programs and professional organizations are related to them.

Subjects

The sixteen subjects selected for this study were between the ages of twenty-three and sixty-six months of age, the average age being 42.88 months. There were eight males and eight females. Categories included: hydrocephalus, cerebral atrophy, cerebral palsy, attention deficit disorder, high cognitive development (giftedness), low social development, speech articulation difficulties, and developmentally delayed. Ethnicity included: Caucasian, Chinese, and Russian. Socioeconomic status of the parent covered all socioeconomic levels. Program enrollment was voluntary. Table 1 summarizes the demographic information of the subjects utilized.

The subjects were selected from the total number of program files collected between 1980 and 1987 based on the following criteria: the child was enrolled in the program at least three months; the child attended regularly; the child was functioning at or above twenty-four months in the expressive language domain; and, the child's records were complete and contained beginning-of-the-year and end-of-the-year reports. The average age at the time of enrollment was 42.88
Table 1

Demographic Characteristics of Subjects

<table>
<thead>
<tr>
<th>Entry</th>
<th>Sex</th>
<th>Age</th>
<th>Ethnicity</th>
<th>Category in Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. B.M. M 23 Caucasian</td>
<td>Hydrocephalus</td>
<td>8 mos.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. M.F. F 24 Caucasian</td>
<td>Gifted/Low Social</td>
<td>8 mos.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I.P. M 33 Russian</td>
<td>Dev. Delayed</td>
<td>8 mos.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. V.C. F 33 Chinese</td>
<td>Low Social</td>
<td>9 mos.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. D.J. F 33 Caucasian</td>
<td>Gifted/Low Social</td>
<td>9 mos.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. J.P. F 35 Caucasian</td>
<td>Dev. Delayed</td>
<td>7 mos.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. J.S. F 40 Caucasian</td>
<td>Cerebral Atrophy</td>
<td>8 mos.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. C.L. F 40 Caucasian</td>
<td>Articulation/Soc.</td>
<td>3 mos.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. S.B. F 50 Caucasian</td>
<td>Low Social</td>
<td>4 mos.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. W.L. M 60 Caucasian</td>
<td>Articulation/Soc.</td>
<td>7 mos.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. S.C. M 63 Chinese</td>
<td>Attention Deficit</td>
<td>10 mos.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
months, and average time of enrollment in the program was 8.56 months.

Research Design

A single subject research design with pretest and posttest scores was utilized. This design was chosen because of the ability to document ongoing variability of individual child change. The children served as their own controls. Individual gains, the speed of change, and the manner in which skills are acquired were documented for each child. Variability of skill levels, differing needs of each child, emphasis on child uniqueness and the differences of one child versus group data were demonstrated utilizing the single subject design.

Upon entry to the program, usually in the Fall, the children were assessed to determine baseline functioning. The Brigance Diagnostic Inventory of Early Development, a criterion-related diagnostic instrument (see sample in Appendix D), was used to determine performance in all developmental domains except for the social development (not included in this scale). The Portage Guide to Early Education was used for the assessment of social development (see Appendix E).

The children were reassessed at the end of the school year, usually in the Spring, to determine overall individual child gains in each area of development. Child
gains were determined by an increase in developmental months.

**Evaluation Instrument**

To demonstrate the impact of early intervention services, several formulas have been developed in an attempt to compare the rate of development prior to intervention with the change of rate of development during intervention and also to account for the maturational gains. Rosenberg, Robinson, Finkler, & Rose (1987) compared formulas by Irwin & Wong, Simeonsson & Wiergerink, Wolery, and Rosenberg, Robinson, Finkler, & Rose (1987) and concluded that all the formulas were highly correlated. For this study, the Rosenberg et al. (1987) formula was utilized to determine the change in rate of development.

The Rosenberg et al. (1987) formula is:

\[
\text{Developmental Gain} = \frac{\text{Pretest Developmental Age} - \text{Time of Intervention}}{\text{Pretest Chronological Age} - \text{Time of Intervention}}
\]

Where:

Developmental Gain is the difference in months between the functioning level at program entry and the functioning level at the end of the school year.

Time of Intervention is the time in months the child spent in the program.

Pretest Developmental Age is the functioning
ability of the child at program entry.

Pretest Chronological Age is child's age in months at program entry.

If the child continued at the same rate of development prior to or during intervention, a score of zero was earned; if slower development occurred, a negative score was earned; and, if accelerated development occurred, a positive score was earned. Rosenberg et al. (1987) noted a limitation of using a change of rate of development score, because the formula was based on child development being linear, that is, the child would continue at the same rate without accelerated or retarded periods of development prior to or during intervention. But in actuality, there are periods of rapid and slow development. If developmental growth accelerated at the time of intervention, the intervention effects may be overestimated; similarly, if growth slowed around time of intervention, the program effectiveness would be underestimated. When the formula was used to determine group effects of intervention, the scores would average, but they may be misleading when looking at individual children.

Analysis Design

The data was analyzed in each developmental domain, that is, expressive language, gross motor, fine motor,
cognitive, self-help, social. Developmental age at the pretest level (DA₁) and the posttest level (DA₂), chronological age in months at entering the program (CA₁) and leaving the program (CA₂), time of intervention in months, developmental gains in months were determined; then, the change of rate of development was determined using the Rosenberg et al. (1987) formula. Individual child gains were reported as well as subgroup and group developmental gains and change in rate of development.

Statistical significance are reported utilizing a one-tailed paired t-test (Chase, 1967). Standard deviations and statistical results were reported on each group and subgroup.

Results

Hypothesis 1: Each child will make gains in each area of child development.

Hypothesis 1 was supported. Each child made gains in each developmental area (Tables 2.1 through 2.6).

Hypothesis 1.1: Each child will make gains in the expressive language skills area.

Hypothesis 1.1 was supported. All children made gains of three to seventeen months in the expressive language domain for a mean gain of 8.25 months (Table 2.1). The child that demonstrated a three month gain was functioning two months above age level prior to
intervention. The child that demonstrated a seventeen month gain was functioning twelve months below age level prior to intervention and was enrolled in the program seven months.

Using the change of rate of development formula, nine children earned positive scores (Table 2.1). Of the seven children who received negative change of rate of development scores, six children were functioning approximately at age appropriate developmental levels prior to intervention and reached their age appropriate ceiling level during intervention. One developmentally delayed child was nine months below age level at program entry and, although a gain of five months occurred during an eight month period, he/she did not earn a positive score.

**Hypothesis 1.2:** Each child will make gains in the gross motor skills area.

Hypothesis 1.2 was supported. All children made gains of three to thirty-one months in the gross motor domain for a mean gain of 8.38 months (Table 2.2). The developmentally delayed child that demonstrated a three month gain was functioning twenty-one months below age level at program entry. The cerebral palsy child that demonstrated a gain of thirty-one months over a period of eight months was functioning thirty months below age
Table 2.1

Developmental Gains of Individual Children in the Expressive Language Domain

<table>
<thead>
<tr>
<th>Child</th>
<th><em>Entry Level in Pgm.</em></th>
<th>Months in Pgm.</th>
<th>Functioning Level</th>
<th><strong>Ch. in Gain Rt. Dev.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1) B.M.</td>
<td>23</td>
<td>8</td>
<td>24</td>
<td>30</td>
</tr>
<tr>
<td>2) M.F</td>
<td>24</td>
<td>8</td>
<td>36</td>
<td>40</td>
</tr>
<tr>
<td>3) I.P.</td>
<td>33</td>
<td>8</td>
<td>24</td>
<td>29</td>
</tr>
<tr>
<td>4) V.C.</td>
<td>33</td>
<td>9</td>
<td>36</td>
<td>42</td>
</tr>
<tr>
<td>5) D.J.</td>
<td>33</td>
<td>9</td>
<td>36</td>
<td>48</td>
</tr>
<tr>
<td>6) J.J.</td>
<td>35</td>
<td>28</td>
<td>50</td>
<td>65</td>
</tr>
<tr>
<td>7) J.P.</td>
<td>36</td>
<td>7</td>
<td>24</td>
<td>41</td>
</tr>
<tr>
<td>8) J.S.</td>
<td>40</td>
<td>8</td>
<td>27</td>
<td>43</td>
</tr>
<tr>
<td>9) C.L.</td>
<td>40</td>
<td>3</td>
<td>38</td>
<td>44</td>
</tr>
<tr>
<td>10) M.K.</td>
<td>48</td>
<td>8</td>
<td>39</td>
<td>48</td>
</tr>
<tr>
<td>11) S.B.</td>
<td>50</td>
<td>4</td>
<td>54</td>
<td>60</td>
</tr>
<tr>
<td>12) G.C.</td>
<td>51</td>
<td>3</td>
<td>40</td>
<td>45</td>
</tr>
<tr>
<td>13) D.R.</td>
<td>51</td>
<td>10</td>
<td>53</td>
<td>56</td>
</tr>
<tr>
<td>14) W.L.</td>
<td>60</td>
<td>7</td>
<td>66</td>
<td>72</td>
</tr>
<tr>
<td>15) S.C.</td>
<td>63</td>
<td>10</td>
<td>48</td>
<td>56</td>
</tr>
<tr>
<td>16) J.M</td>
<td>66</td>
<td>7</td>
<td>55</td>
<td>63</td>
</tr>
</tbody>
</table>

*age in months

**change in rate of development

\( DA_1 \) - developmental age in months at pretest

\( DA_2 \) - developmental age in months at posttest
### Table 2.2

#### Developmental Gains of Individual Children in the Gross Motor Domain

<table>
<thead>
<tr>
<th>Child</th>
<th>Entry *Level in Pgm.</th>
<th>Months</th>
<th>Functioning Level</th>
<th><strong>Ch. in Gain Rt. Dev.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1) B.M.</td>
<td>23</td>
<td>8</td>
<td>24 33</td>
<td>9 0.082</td>
</tr>
<tr>
<td>2) M.F</td>
<td>24</td>
<td>8</td>
<td>30 34</td>
<td>4 -0.750</td>
</tr>
<tr>
<td>3) I.P.</td>
<td>33</td>
<td>8</td>
<td>12 15</td>
<td>3 0.011</td>
</tr>
<tr>
<td>4) V.C.</td>
<td>33</td>
<td>9</td>
<td>36 43</td>
<td>7 -0.313</td>
</tr>
<tr>
<td>5) D.J.</td>
<td>33</td>
<td>9</td>
<td>38 48</td>
<td>10 -0.041</td>
</tr>
<tr>
<td>6) J.J.</td>
<td>35</td>
<td>28</td>
<td>9 12</td>
<td>3 -0.150</td>
</tr>
<tr>
<td>7) J.P.</td>
<td>36</td>
<td>7</td>
<td>32 37</td>
<td>5 -0.175</td>
</tr>
<tr>
<td>8) J.S.</td>
<td>40</td>
<td>8</td>
<td>33 41</td>
<td>8 0.175</td>
</tr>
<tr>
<td>9) C.L.</td>
<td>40</td>
<td>3</td>
<td>37 43</td>
<td>6 1.075</td>
</tr>
<tr>
<td>10) M.K.</td>
<td>48</td>
<td>8</td>
<td>18 49</td>
<td>31 3.500</td>
</tr>
<tr>
<td>11) S.B.</td>
<td>50</td>
<td>4</td>
<td>36 48</td>
<td>12 2.280</td>
</tr>
<tr>
<td>12) G.C.</td>
<td>51</td>
<td>3</td>
<td>43 48</td>
<td>5 0.824</td>
</tr>
<tr>
<td>13) D.R.</td>
<td>51</td>
<td>10</td>
<td>50 56</td>
<td>6 -0.380</td>
</tr>
<tr>
<td>14) W.L.</td>
<td>60</td>
<td>7</td>
<td>60 65</td>
<td>5 -0.286</td>
</tr>
<tr>
<td>15) S.C.</td>
<td>63</td>
<td>10</td>
<td>43 57</td>
<td>14 0.717</td>
</tr>
<tr>
<td>16) J.M</td>
<td>66</td>
<td>7</td>
<td>66 72</td>
<td>6 -0.143</td>
</tr>
</tbody>
</table>

*age in months
**change in rate of development

DA₁ - developmental age in months at pretest
DA₂ - developmental age in months at posttest
Table 2.3

Developmental Gains of Individual Children in the Fine Motor Domain

<table>
<thead>
<tr>
<th>Child</th>
<th>Entry Level *</th>
<th>Months in Pgm</th>
<th>DA₁</th>
<th>DA₂</th>
<th>Gain</th>
<th>Rt. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) B.M.</td>
<td>23</td>
<td>8</td>
<td>18</td>
<td>24</td>
<td>6</td>
<td>-0.033</td>
</tr>
<tr>
<td>2) M.F</td>
<td>24</td>
<td>8</td>
<td>24</td>
<td>30</td>
<td>6</td>
<td>-0.250</td>
</tr>
<tr>
<td>3) I.P.</td>
<td>33</td>
<td>8</td>
<td>12</td>
<td>22</td>
<td>10</td>
<td>0.886</td>
</tr>
<tr>
<td>4) V.C.</td>
<td>33</td>
<td>9</td>
<td>36</td>
<td>42</td>
<td>6</td>
<td>-0.424</td>
</tr>
<tr>
<td>5) D.J.</td>
<td>33</td>
<td>9</td>
<td>30</td>
<td>48</td>
<td>18</td>
<td>1.091</td>
</tr>
<tr>
<td>6) J.J.</td>
<td>35</td>
<td>28</td>
<td>32</td>
<td>54</td>
<td>22</td>
<td>-0.128</td>
</tr>
<tr>
<td>7) J.P.</td>
<td>36</td>
<td>7</td>
<td>29</td>
<td>41</td>
<td>12</td>
<td>0.908</td>
</tr>
<tr>
<td>8) J.S.</td>
<td>40</td>
<td>8</td>
<td>28</td>
<td>41</td>
<td>13</td>
<td>0.925</td>
</tr>
<tr>
<td>9) C.L.</td>
<td>40</td>
<td>3</td>
<td>39</td>
<td>45</td>
<td>6</td>
<td>1.025</td>
</tr>
<tr>
<td>10) M.K.</td>
<td>48</td>
<td>8</td>
<td>30</td>
<td>51</td>
<td>21</td>
<td>2.000</td>
</tr>
<tr>
<td>11) S.B.</td>
<td>50</td>
<td>4</td>
<td>54</td>
<td>60</td>
<td>6</td>
<td>0.420</td>
</tr>
<tr>
<td>12) G.C.</td>
<td>51</td>
<td>3</td>
<td>51</td>
<td>53</td>
<td>2</td>
<td>-0.333</td>
</tr>
<tr>
<td>13) D.R.</td>
<td>51</td>
<td>10</td>
<td>42</td>
<td>46</td>
<td>4</td>
<td>-0.424</td>
</tr>
<tr>
<td>14) W.L.</td>
<td>60</td>
<td>7</td>
<td>60</td>
<td>72</td>
<td>12</td>
<td>0.714</td>
</tr>
<tr>
<td>15) S.C.</td>
<td>63</td>
<td>10</td>
<td>48</td>
<td>52</td>
<td>4</td>
<td>-0.362</td>
</tr>
<tr>
<td>16) J.M.</td>
<td>66</td>
<td>7</td>
<td>60</td>
<td>65</td>
<td>5</td>
<td>-0.195</td>
</tr>
</tbody>
</table>

*age in months
**change in rate of development
DA₁ - developmental age in months at pretest
DA₂ - developmental age in months at posttest
Table 2.4

Developmental Gains of Individual Children in the Cognitive Domain

<table>
<thead>
<tr>
<th>Child</th>
<th>Entry *Level</th>
<th>Months in Pgm.</th>
<th>Functioning Level</th>
<th>**Ch. in Rt. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>B.M.</td>
<td>23</td>
<td>8</td>
<td>24</td>
</tr>
<tr>
<td>2</td>
<td>M.F</td>
<td>24</td>
<td>8</td>
<td>42</td>
</tr>
<tr>
<td>3</td>
<td>I.P.</td>
<td>33</td>
<td>8</td>
<td>30</td>
</tr>
<tr>
<td>4</td>
<td>V.C.</td>
<td>33</td>
<td>9</td>
<td>30</td>
</tr>
<tr>
<td>5</td>
<td>D.J.</td>
<td>33</td>
<td>9</td>
<td>42</td>
</tr>
<tr>
<td>6</td>
<td>J.J.</td>
<td>35</td>
<td>28</td>
<td>40</td>
</tr>
<tr>
<td>7</td>
<td>J.P.</td>
<td>36</td>
<td>7</td>
<td>40</td>
</tr>
<tr>
<td>8</td>
<td>J.S.</td>
<td>40</td>
<td>8</td>
<td>37</td>
</tr>
<tr>
<td>9</td>
<td>C.L.</td>
<td>40</td>
<td>3</td>
<td>44</td>
</tr>
<tr>
<td>10</td>
<td>M.K.</td>
<td>48</td>
<td>8</td>
<td>43</td>
</tr>
<tr>
<td>11</td>
<td>S.B.</td>
<td>50</td>
<td>4</td>
<td>50</td>
</tr>
<tr>
<td>12</td>
<td>G.C.</td>
<td>51</td>
<td>3</td>
<td>55</td>
</tr>
<tr>
<td>13</td>
<td>D.R.</td>
<td>51</td>
<td>10</td>
<td>72</td>
</tr>
<tr>
<td>14</td>
<td>W.L.</td>
<td>60</td>
<td>7</td>
<td>66</td>
</tr>
<tr>
<td>15</td>
<td>S.C.</td>
<td>63</td>
<td>10</td>
<td>54</td>
</tr>
<tr>
<td>16</td>
<td>J.M.</td>
<td>66</td>
<td>7</td>
<td>60</td>
</tr>
</tbody>
</table>

* age in months
**change in rate of development
DA₁ - developmental age in months at pretest
DA₂ - developmental age in months at posttest
<table>
<thead>
<tr>
<th>Child</th>
<th>Entry *Level in Pgm.</th>
<th>Months in Pgm.</th>
<th>Functioning Level DA&lt;sub&gt;1&lt;/sub&gt;</th>
<th>DA&lt;sub&gt;2&lt;/sub&gt;</th>
<th>**Ch. in Gain Rt. Dev.</th>
<th>**Ch. in Gain Rt. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.M.</td>
<td>23</td>
<td>8</td>
<td>18</td>
<td>20</td>
<td>2</td>
<td>-0.533</td>
</tr>
<tr>
<td>M.F.</td>
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<td>8</td>
<td>24</td>
<td>38</td>
<td>14</td>
<td>0.750</td>
</tr>
<tr>
<td>I.P.</td>
<td>33</td>
<td>8</td>
<td>12</td>
<td>18</td>
<td>6</td>
<td>0.386</td>
</tr>
<tr>
<td>V.C.</td>
<td>33</td>
<td>9</td>
<td>36</td>
<td>42</td>
<td>6</td>
<td>-0.424</td>
</tr>
<tr>
<td>D.J.</td>
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<td>9</td>
<td>38</td>
<td>43</td>
<td>5</td>
<td>-0.596</td>
</tr>
<tr>
<td>J.J.</td>
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<td>28</td>
<td>26</td>
<td>43</td>
<td>17</td>
<td>-0.136</td>
</tr>
<tr>
<td>J.P.</td>
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<td>7</td>
<td>44</td>
<td>48</td>
<td>4</td>
<td>-0.651</td>
</tr>
<tr>
<td>J.S.</td>
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<td>8</td>
<td>41</td>
<td>48</td>
<td>7</td>
<td>-0.150</td>
</tr>
<tr>
<td>C.L.</td>
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<td>3</td>
<td>39</td>
<td>60</td>
<td>21</td>
<td>6.025</td>
</tr>
<tr>
<td>M.K.</td>
<td>48</td>
<td>8</td>
<td>39</td>
<td>45</td>
<td>6</td>
<td>-0.063</td>
</tr>
<tr>
<td>S.B.</td>
<td>50</td>
<td>4</td>
<td>54</td>
<td>60</td>
<td>6</td>
<td>0.420</td>
</tr>
<tr>
<td>G.C.</td>
<td>51</td>
<td>3</td>
<td>48</td>
<td>50</td>
<td>2</td>
<td>-0.274</td>
</tr>
<tr>
<td>D.R.</td>
<td>51</td>
<td>10</td>
<td>56</td>
<td>62</td>
<td>6</td>
<td>-0.498</td>
</tr>
<tr>
<td>W.L.</td>
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<td>7</td>
<td>60</td>
<td>78</td>
<td>18</td>
<td>1.571</td>
</tr>
<tr>
<td>S.C.</td>
<td>63</td>
<td>10</td>
<td>50</td>
<td>57</td>
<td>7</td>
<td>-0.094</td>
</tr>
<tr>
<td>J.M.</td>
<td>66</td>
<td>7</td>
<td>60</td>
<td>63</td>
<td>3</td>
<td>-0.480</td>
</tr>
</tbody>
</table>

*age in months

**change in rate of development

DA<sub>1</sub> - developmental age in months at pretest

DA<sub>2</sub> - developmental age in months at posttest
Table 2.6

Developmental Gains of Individual Children in the Social/Emotional Domain

<table>
<thead>
<tr>
<th>Child</th>
<th>Entry Age</th>
<th>Months in Pgm.</th>
<th>Functioning Level</th>
<th><strong>Ch. in Gain</strong></th>
<th><strong>Rt. Dev.</strong></th>
</tr>
</thead>
<tbody>
<tr>
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*age in months
**change in rate of development
DA₁ - developmental age in months at pretest
DA₂ - developmental age in months at posttest
level prior to intervention.

Using the change of rate of development formula, eight children earned positive scores (Table 2.2). Of the eight children who received negative change of rate of development scores, seven children were functioning approximately at age appropriate developmental levels prior to intervention and reached their age appropriate ceiling levels during intervention. One cerebral palsy child was functioning twenty-six months below age level prior to intervention and did not earn a positive score. Because of his/her physical limitations, an accelerated gain was not expected.

**Hypothesis 1.3:** Each child will make gains in the fine motor skills area.

Hypothesis 1.3 was supported. All children made gains of two to twenty-two months in the fine motor domain for a mean gain of 9.56 months (Table 2.3). The child that demonstrated a two month gain was functioning at age level prior to intervention and was enrolled in the program for three months. The cerebral palsy child that demonstrated a twenty-two month gain over a period of twenty-eight months was functioning three months below age level prior to intervention.

Using the change of rate of development formula, eight children earned positive scores (Table 2.3). Of the eight children who received negative change of rate
of development scores, four children were functioning approximately at an age appropriate developmental level prior to intervention and reached their age appropriate ceiling level during intervention. Of the remaining four children who earned negative scores, one child was hydrocephalic, one had an attention deficit disorder, and two children were developmentally delayed. All four of these children made gains of four to six months during intervention, but did not demonstrate accelerated developmental growth in this area as a result of intervention.

**Hypothesis 1.4:** Each child will make gains in the cognitive skills area.

Hypothesis 1.4 was supported. All children made gains of six to thirty-three months in the cognitive domain for a mean gain of 16.06 months (Table 2.4). The child that demonstrated a six month gain was functioning nine months above age level in this area prior to intervention. The child that demonstrated a thirty-three month gain over a period of ten months was functioning nine months below age level in this area prior to intervention.

Using the change in rate of development formula, fourteen children earned positive scores (Table 2.4). Of the two who earned negative scores, both children were functioning approximately at age appropriate developmental levels prior to intervention and reached their age
appropriate ceiling level during intervention.

Hypothesis 1.5: Each child will make gains in the self-help skills areas.

Hypothesis 1.5 was supported. All children made gains of two to twenty-one months in the self-help domain for a mean gain of 8.13 months (Table 2.5). The child that demonstrated a two month gain over a period of eight months was functioning five months below age level prior to intervention. The child that demonstrated a twenty-one month gain during a three month period was functioning at age level prior to intervention and accelerated his/her rate of development in this area during intervention.

Using the change in rate of development formula, five children earned positive scores (Table 2.5). Of the eleven children who earned negative change of rate of development scores, six of the children were functioning approximately at age appropriate developmental levels prior to intervention and reached their age appropriate ceiling level during intervention. The remaining five children included one hydrocephalic, two cerebral palsy, one attention deficit disorder, and one developmentally delayed. The children may have had difficulty overcoming physical limitations caused by their etiologies. The five children demonstrated gains of two to seventeen months but did not accelerate their developmental rates in this area as a result of intervention.
**Hypothesis 1.6:** Each child will make gains in the social/emotional skills area.

Hypothesis 1.6 was supported. All children made gains of three to thirty-six months in the social/emotional domain for a mean gain of 12.75 months (Table 2.6). The child that demonstrated a three month gain over a period of eight months was functioning eleven months below age level prior to intervention. The child that demonstrated a thirty-six month gain over a twenty-eight month period was functioning nine months below age level prior to intervention.

Using the change in rate of development formula, thirteen children earned positive scores (Table 2.6). Of the three children that earned negative scores, one was functioning approximately at age appropriate developmental level prior to intervention and reached his/her age appropriate ceiling level during intervention. One child who did not earn a positive score was hydrocephalic, and one child was developmentally delayed. Both children made gains of three to five months during intervention, but did not accelerate developmental growth in this area during intervention.

**Hypothesis 2:** Each subgroup will make gains in each area of child development.

Hypothesis 2 was supported. All subgroups did make
gains in each area of development. Table 3 shows gains made by Subgroup 1; table 4 shows gains made by Subgroup 2; and, table 5 shows gains made by Subgroup 3. The table for each group shows the gains, change in rate of developmental score, standard deviation, and paired t-test results.

**Hypothesis 2.1:** Subgroup 1 of children with physically handicapping conditions will make gains in each area of child development.

Hypothesis 2.1 was supported. Subgroup 1 consisted of physically impaired children, that is, hydrocephalic (B.M.), cerebral palsy (J.J. & M.K.), and cerebral atrophy (J.S.). Ages ranged from twenty-three months to forty-eight months for a mean age of 42.88 months. Time in program ranged from eight to twenty-eight months for an average time in program of 8.56 months. Subgroup 1 made gains of eight to seventeen months in each area of development (Table 3).

**Hypothesis 2.1a:** Subgroup 1 of children with physically handicapping conditions will make gains in the area of expressive language.

Hypothesis 2.1a was supported (p<.01). In the expressive language domain, Subgroup 1 made gains of six to sixteen months for a mean developmental gain of 11.50 months (Table 3). The child that demonstrated a six month gain over a period of eight months was functioning one
<table>
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<tr>
<th>Domain</th>
<th>Mean CA$_{1}$</th>
<th>Mean CA$_{2}$</th>
<th>Mean DA$_{1}$</th>
<th>Mean DA$_{2}$</th>
<th>Mean Gain</th>
<th>Ch. in</th>
<th>Rt. Dev.</th>
<th>t-test</th>
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<td>2.049</td>
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month above age level prior to intervention. The child that demonstrated a sixteen month gain over a period of eight months was functioning thirteen months below age level prior to intervention.

The average change in rate of development score was -0.074 (Table 3). Two of the children earned positive change in rate of development scores, and two children earned negative scores. Both children that earned negative scores were functioning approximately at age appropriate developmental level prior to intervention and reached their age appropriate ceiling during intervention. **Hypothesis 2.1b:** Subgroup 1 of children with physically handicapping conditions will make gains in the area of gross motor development.

Hypothesis 2.1b was supported. In the gross motor domain, Subgroup 1 demonstrated gains of three to thirty-one months for a mean developmental gain of 12.75 months, but the gains were not significant (Table 3). Considering the children's physical limitations, the lack of significance in this area was not unexpected. The child that demonstrated a three month gain over a period of twenty-eight months was functioning twenty-six months below age level prior to intervention. The child that demonstrated a thirty-one month gain over an eight month period was functioning thirty months below age level prior to intervention.
The average change in rate of development score was 0.406 (Table 3). Three of the children earned positive change in rate of development scores. One cerebral palsy child earned a score of -0.150 which indicated a slight decrease in the rate of development.

**Hypothesis 2.1c:** Subgroup 1 of children with physically handicapping conditions will make gains in the area of fine motor development.

Hypothesis 2.1c was supported (p<.025). In the fine motor domain, Subgroup 1 made gains of six to twenty-two months for a mean developmental gain of 15.5 months (Table 3). The child that demonstrated a six month gain over a period of eight months was functioning five months below age level prior to intervention. The child that demonstrated a twenty-two month gain over a period of twenty-eight months was functioning three months below age level prior to intervention.

The average change in rate of development score was 0.452 (Table 3). Two children earned positive change in rate of development scores. One hydrocephalic child and one cerebral palsy child earned slight negative scores of -0.033 and -0.128. This decrease in the rate of change of development indicated that the children's rate of development did not accelerate in this area during intervention, but it did not decelerate either.

Considering the children's physical limitation, an
acceleration was not expected.

**Hypothesis 2.1d:** Subgroup 1 of children with physically handicapping conditions will make gains in the area of cognitive development.

Hypothesis 2.1d was supported \(p<.001\). In the cognitive domain, Subgroup 1 made gains of twelve to twenty-six months for a mean developmental gain of 17.25 months (Table 3). The child that demonstrated a twelve month gain over an eight months period was functioning one month above age level prior to intervention. The child that demonstrated a twenty-six month gain over a period of twenty-eight months was functioning five months above age level prior to intervention.

The average score for the change in rate of development was 0.341 (Table 3). Three children earned positive change in rate of development scores. One cerebral palsy child earned a score of -0.214. This child was functioning approximately at age appropriate level prior to intervention and reached his/her age appropriate ceiling level during intervention.

**Hypothesis 2.1e:** Subgroup 1 of children with physically handicapping conditions will make gains in the area of self-help.

Hypothesis 2.1e was supported \(p<.05\). In the self-help domain, Subgroup 1 made gains of two to seventeen months for a mean developmental gain of 8.00 months (Table
3). The child that demonstrated a two month gain over an eight month period was functioning five months below age level prior to intervention. The child that demonstrated a seventeen month gain during twenty-eight months of intervention services was functioning nine months below age level prior to intervention.

The average score for the change in rate of development was -0.234 (Table 3). All four children earned negative scores. One child was functioning approximately at age level prior to intervention and reached his/her age appropriate ceiling level during intervention. The remaining three children were functioning five to nine months below age level prior to intervention. Even though the children made gains, their rate of development did not accelerate in this area during intervention. **Hypothesis 2.1f:** Subgroup 1 of children with physically handicapping conditions will make gains in the area of social/emotional development.

Hypothesis 2.1f was supported (p<.05). In the social/emotional domain, Subgroup 1 made gains of three to thirty-six months for a mean developmental gain of 16.75 months (Table 3). The children that demonstrated a three month gain over an eight month period and the child that demonstrated thirty-six month gain over a period of twenty-eight months were both functioning eleven months below age level prior to intervention.
The average change in rate of development score was 0.630. Three children earned positive change in rate of development scores. One hydrocephalic child earned a slightly negative score of -0.147. This twenty-three month old child was eleven months delay in this area. Although a gain of three months occurred during eight months of intervention services, the child's rate of development did not accelerate in this area during intervention.

**Hypothesis 2.2:** Subgroup 2 of developmentally delayed children (five to fourteen months delayed in four or more areas) will make gains in each area of child development.

Hypothesis 2.2 was supported. Subgroup 2 consisted of four developmentally delayed children (I.P., S.B., D.R., and S.C.). Ages ranged from thirty-three to sixty-three months for a mean age of 49.25 months. The children attended the program from four to ten months for a mean time in program of 8 months. All areas of development demonstrated average gains of five to eighteen months. Three change of rate of development scores were positive and three were slightly negative. Table 4 shows data concerning Subgroup 2.

**Hypothesis 2.2a:** Subgroup 2 of developmentally delayed children will make gains in the area of expressive language.

Hypothesis 2.2a was supported (p<.01). In the
Table 4
Developmental Gains of Subgroup 2:
Developmentally Delayed Children

| Domain | Mean CA<sub>1</sub> | Mean CA<sub>2</sub> | Mean time | Mean DA<sub>1</sub> | Mean DA<sub>2</sub> | Mean Gain | Ch. in Rt.Dev | sd | t-test | p<
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expressive language domain, Subgroup 2 made gains of three to eight months for a mean developmental gain of 5.5 months (Table 4). The child that demonstrated a three month developmental gain over a ten month period was functioning two months above age level prior to program entry and reached his/her age appropriate ceiling level during intervention. The child that demonstrated an eight month developmental gain over a period of ten months was functioning fifteen months below age level at program entry.

The average change in rate of development score was -0.221 (Table 4). Two children earned positive scores, and two children earned negative scores. One child was functioning approximately at age appropriate level prior to intervention and reached his/her age appropriate ceiling level during intervention. The other child was functioning nine months below age level prior to intervention. Although a developmental gain of five months occurred over a period of eight months, the rate of development in this area did not accelerate during intervention.

Hypothesis 2.2b: Subgroup 2 of developmentally delayed children will make gains in the area of gross motor development.

Hypothesis 2.2b was supported (p<.025). In the gross motor domain, Subgroup 2 made gains of three to fourteen months for a mean developmental gain of 8.750 months (Table
4). The child that demonstrated a three month developmental gain over an eight month period was functioning twenty-one months below age level prior to intervention. The child that demonstrated a fourteen month gain over a period of ten months was functioning twenty months below age level prior to intervention.

The average change in rate of development score was 0.378 (Table 4). Three children earned positive change in rate of development scores. One child was approximately at age appropriate developmental level prior to intervention and reached his/her age appropriate ceiling level during ten months of intervention.

Hypothesis 2.2c: Subgroup 2 of developmentally delayed children will make gains in the area of fine motor development.

Hypothesis 2.2c was supported (p<.025). In the fine motor domain, Subgroup 2 made gains of four to ten months for a mean developmental gain of 6.00 months (Table 4). The two children that demonstrated gains of four months over a period of ten months were functioning nine to fifteen months below age level prior to intervention. The child that demonstrated a ten month gain over a period of eight months was functioning twenty-one months below age level prior to intervention.

The average change in rate of development score was -0.042 (Table 4). Two children earned positive scores,
and two children earned negative scores. Both of the children that earned negative scores were at least nine months delayed in this area prior to intervention. Both children demonstrated a four month gain over a period of ten months, but the rate of development did not accelerate during intervention.

**Hypothesis 2.2d:** Subgroup 2 of developmentally delayed children will make gains in the area of cognitive development.

Hypothesis 2.2d was supported (p<.025). In the area of cognitive development, Subgroup 2 made gains of ten to thirty three months for a mean developmental gain of 18.5 months (Table 4). The child that demonstrated a ten month developmental gain over a four month period was functioning at age level prior to intervention. The child that demonstrated a thirty-three month gain over a period of ten months was functioning nine months below age level prior to intervention.

Using the change in rate of development formula, an average score of 1.267 was earned (Table 4). All four of the children earned positive scores that indicated all four children accelerated their rate of development during intervention.

**Hypothesis 2.2e:** Subgroup 2 of developmentally delayed children will make gains in the area of self-help skills.

Hypothesis 2.2e was supported (p<.0005). In the
area of self-help, Subgroup 2 made gains of six to seven months for a mean developmental gain of 6.25 months (Table 4). Three children made gains of six months. One child was functioning twenty-one months below age level prior to eight months of intervention, and two children were functioning three to five months above age level prior to intervention. The child that demonstrated developmental gains of seven months over a ten month period was functioning thirteen months below age level prior to intervention.

Using the change in rate of development formula, an average score of -0.092 was earned (Table 4). Two children earned positive scores, and two children earned negative scores. One child that earned a negative score was functioning approximately at age appropriate developmental level prior to intervention and reached his/her appropriate ceiling during intervention. The other child was thirteen months below age level prior to ten months of intervention and earned a slightly negative score of -0.094. The decrease indicated that the child did not accelerate his/her rate of development in this area during intervention. **Hypothesis 2.2f:** Subgroup 2 of developmentally delayed children will make gains in the area of social/emotional development.

Hypothesis 2.2f was supported (p<.025). In the area
of social/emotional development, Subgroup 2 made gains of six to twenty-four months for a mean developmental gain of 14.5 months (Table 4). The child that demonstrated a six month developmental gain over a period of eight months was functioning nineteen months below age level prior to intervention. The child that demonstrated a twenty-four month developmental gain over a four month period was functioning twenty months below age level prior to intervention.

Using the change in rate of development formula, a score of 1.101 was earned (Table 4). All four children earned positive scores indicating that the rate of change of development accelerated during intervention.

**Hypothesis 2.3:** Subgroup 3 of children functioning at or below age level in the area of social/emotional development will make gains in all areas of development.

Hypothesis 2.3 was supported. Subgroup 3 consisted of eight children functioning at or below age level in the social/emotional skills area (M.F., V.C., D.J., J.P., C.L., G.C., W.L., and J.M.). Ages ranged from twenty-four months to sixty-six months for an average age of 42.88 months. Time in program ranged from three to eight months for an average time in program of 6.62 months. Developmental gains ranged from 6.0 to 18.25 months in all areas. Table 5 shows data regarding Subgroup 3.
Hypothesis 2.3a: Subgroup 3 of children functioning at or below age level in the area of social/emotional development will make gains in the area of expressive language.

Hypothesis 2.3a was supported (p<.005). In the area of expressive language, Subgroup 3 made gains of four to seventeen months for a mean developmental gain of 8.00 months (Table 5). The child that demonstrated a four month developmental gain during eight months of intervention was functioning twelve months above age level prior to intervention. The child that demonstrated a seventeen month developmental gain over a seven month period was functioning twelve months below age level prior to intervention.

Using the change in rate of development formula, a score of 0.242 was earned (Table 5). Five children earned positive change in rate of development scores. The three children that earned negative scores were functioning approximately at age appropriate level prior to intervention and reached their age appropriate ceiling level during intervention.

Hypothesis 2.3b: Subgroup 3 of children at or below age level in the area of social/emotional development will make gains in the gross motor area.

Hypothesis 2.3b was supported (p<.0005). In the area of gross motor development, Subgroup 3 made gains
Table 5
Developmental Gains of Subgroup 3:
Children Functioning At or Below
Age Level in the Social/
Emotional Skills Area

<table>
<thead>
<tr>
<th>Domain</th>
<th>Mean CA&lt;sub&gt;1&lt;/sub&gt;</th>
<th>Mean CA&lt;sub&gt;2&lt;/sub&gt;</th>
<th>Mean time</th>
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<th>t-test</th>
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<td>41.38</td>
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<td>0.304</td>
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| Cog.        | 42.88               | 49.50               | 6.6       | 47.38               | 61.63               | 14.25     | 1.044          | 5.701 | 7.068  | .0005|
| Self-Help   |                     |                     |           |                     |                     |           |                |    |        |     |
| Help        | 42.88               | 49.50               | 6.6       | 43.63               | 52.75               | 9.13      | 0.359          | 7.415 | 3.480  | .01 |
| Soc./Emot.  |                     |                     |           |                     |                     |           |                |    |        |     |
| Emot.       | 42.88               | 49.50               | 6.6       | 33.63               | 43.50               | 9.88      | 0.705          | 6.512 | 4.288  | .005|
of four to ten months for a mean developmental gain of 6.0 months (Table 5). The child that demonstrated a four month gain over a period of eight months was functioning six months above age level prior to intervention. The child that demonstrated a ten month gain over a nine month period was functioning five months above age level prior intervention.

Using the change in rate of development formula, an average score of 0.092 was earned. Seven of the children were functioning approximately at age appropriate developmental level prior to intervention and reached their age appropriate ceiling during intervention. One developmentally delayed child earned a negative score of -0.175 that indicated that developmental growth did not accelerate during intervention.

Hypothesis 2.3c: Subgroup 3 of children functioning at or below age level in the area of social/emotional development will make gains in the area of fine motor development.

Hypothesis 2.3c was supported (p<.005). In the fine motor area, Subgroup 3 made gains of two to eighteen months for a mean developmental gain of 8.38 months (Table 5). The child that demonstrated a two month gain over a three month period was functioning approximately at age level prior to intervention. The child that demonstrated an eighteen month gain over a period of nine months was
functioning three months below age level prior to intervention.

Using the change in rate of development formula, A score of 0.304 was earned (Table 5). Four children earned positive scores, and four children earned negative change in rate of development scores. Three children that earned negative scores were functioning approximately at age appropriate development prior to intervention and reached their age appropriate ceiling levels during intervention. One developmentally delayed child earned a negative score of -0.195. This score indicated that the child did not accelerate his/her rate of development in this area during seven months of intervention.

**Hypothesis 2.3d**: Subgroup 3 of children functioning at or below age level in the area of social/emotional development will make gains in the area of cognitive development.

Hypothesis 2.3d was supported (p<.0005). Subgroup 3 made gains of six to twenty-four months for a mean developmental gain of 14.25 months (Table 5). The child that demonstrated a six month gain over a period of nine months was functioning nine months above age level prior to intervention. The child that demonstrated a twenty-four month developmental gain over a period of nine months was functioning three months below age level prior to intervention.
Using the change in rate of development formula, Subgroup 3 earned a score of 1.044 in the area of cognitive development (Table 5). Seven children earned positive change in rate of development. The one child that earned a negative score was functioning approximately at age appropriate developmental level prior to intervention and reached his/her age appropriate ceiling level during intervention.

**Hypothesis 2.3e**: Subgroup 3 of children functioning at or below age level in the area of social/emotional development will make gains in the area of self-help development.

Hypothesis 2.3e was supported (p<.01). In the self-help area, Subgroup 3 made gains of two to twenty-one months for a mean developmental gain of 9.13 months (Table 5). The child that demonstrated a two month developmental gain over a period of three months was functioning three months below age level prior to intervention. The child that demonstrated a twenty-one month gain over a period of three months was functioning one month below age level prior to intervention.

Using the change in rate of development formula, an average score of 0.359 was earned in the self-help area (Table 5). Three children earned positive change in rate of development scores, and five children earned negative scores. Three of the children that earned
negative change in rate of development scores were functioning approximately at age appropriate developmental levels prior to intervention and reached their age appropriate ceiling level during intervention. The other two children were three to six months delayed prior to intervention. Although developmental gains of two and three months occurred, the children did not accelerate their rate of development during intervention.

**Hypothesis 2.3f:** Subgroup 3 of children functioning at or below age level in the area of social/emotional development will make gains in the area of social/emotional development.

Hypothesis 2.3f was supported (p<.0005). In the area of social/emotional development, Subgroup 3 made gains of four to twenty-four months for a mean developmental gain of 9.88 months (Table 5). The child that demonstrated a four month gain over a three month period was functioning two months below age level prior to intervention. The child that demonstrated a twenty-four month gain over a period of seven months was functioning eighteen months below age level prior to intervention.

Using the change in rate of development formula, an average score of 0.705 was earned (Table 5). Six children earned positive change in rate of development scores. Of the two children that earned negative scores, one child was functioning approximately at age appropriate
developmental level prior to intervention. One child was functioning four months below age level prior to intervention. Although a gain of five months occurred over a period of seven months, he/she did not accelerate his/her rate of development during intervention.

**Hypothesis 3:** The group of children as a whole will make gains in each area of child development.

As a group, the children made gains of eight to sixteen months in all areas of development. The average age at program entry was 42.88 months, and the average time in the program was 8.56 months. Table 6 shows the analysis of group data.

The Rosenberg et al. (1987) formula for the change in rate of development operates on the premise that development will be linear. Individual change in rate of development scores can overestimate or underestimate program effects on developmental gains. By averaging the scores of the children, a better representation of program effects occurs. As a group, children demonstrated positive change in rate of development scores indicating that developmental growth accelerated during intervention. All t-test analyses were significant (p < .0005).

**Hypothesis 3.1:** The group of children as a whole will make gains in the expressive language area.

Hypothesis 3.1 was supported (p<.0005). In the
## Developmental Gains of Children as a Whole Group

<table>
<thead>
<tr>
<th>Domain</th>
<th>Exp. Mean</th>
<th>Exp. Gain</th>
<th>DA1 Mean</th>
<th>DA1 Gain</th>
<th>DA2 Mean</th>
<th>DA2 Gain</th>
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<td>9.56</td>
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<td>8.6</td>
<td>45.56</td>
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<td>16.06</td>
<td>0.814</td>
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expressive language area, the average developmental gain of the group was 8.25 months. The change in rate of development score was 0.016.

**Hypothesis 3.2:** The group of children as a whole will make gains in the gross motor skills area.

Hypothesis 3.2 was supported (p<.0005). In the gross motor area, the average developmental group gain was 8.38 months. The change in rate of development score was 0.153.

**Hypothesis 3.3:** The group of children as a whole will make gains in the fine motor skills area.

Hypothesis 3.3 was supported (p<.0005). In the fine motor area, the average developmental group gain was 9.56 months. The change in rate of development score was 0.253.

**Hypothesis 3.4:** The group of children as a whole will make gains in the cognitive development area.

Hypothesis 3.4 was supported (p<.0005). In the cognitive development area, the average developmental gain of the group was 16.06 months. The change in rate of development score was 0.814.

**Hypothesis 3.5:** The group of children as a whole will make gains in the self-help skills area.

Hypothesis 3.5 was supported (p<.0005). In the self-help skills area, the average developmental gain of the group was 8.13 months. The change in rate of development score was 0.010.

**Hypothesis 3.6:** The group of children as a whole will
make gains in the social/emotional skills area.

Hypothesis 3.6 was supported (p<.0005). In the social/emotional developmental area, the average group developmental gain was 12.75 months. The change in rate of development score was 0.753.
CHAPTER III

DISCUSSION, IMPLICATIONS, & CONCLUSIONS

Discussion

This study was designed to investigate the impact of early intervention on the whole child with particular focus on the evaluation of developmental changes in the areas of expressive language, gross motor, fine motor, cognitive, self-help, and social/emotional development. The results of this study supported available research in the field of early childhood education for the handicapped (Bricker & Sheehan, 1981; Fewell & Sandall, 1985; Hayden & Dmitriev, 1972; Shearer & Shearer, 1972; and Wolery & Dyk, 1985). Developmental gains were made by every child in each area as a result of early intervention.

Similar to the studies conducted by Oelwein, Fewell, & Pruess (1972) and Wolery & Dyk (1985), the use of a prediction index to account for maturational influences strengthened the results of this study. Unlike the early studies of child development (Kirk, 1956; Schweinhart, et al, 1962; Skeels & Dye, 1939; and Zigler, 1979), this study demonstrated gains in all areas of child development, not just the areas of cognitive and social development.
The results in the cognitive and social/emotional developmental areas were particularly encouraging. All children, regardless of impairment or disability, made significant gains in these areas. Due to handicapping condition, some children had limited abilities in the expressive language, gross motor, fine motor, and self-help areas. Developmental gains in the cognitive area helped to dispel the myth that all handicapped children are mentally retarded.

Through a structured and organized early intervention program, children demonstrated the ability to learn and to achieve success. Developmental gains in the social/emotional area helped to increase the quality of life of the children through the development of skills to relate to all adults, children, and parents. The children's relationships with peers became more positive as the social skills developed. Parents began to direct their energies in a more positive direction as their child made progress rather than expending energy on worrying or stress. The children's self-esteem increased as they achieved success and learned that they were capable people.

Mothering behavior by graduate students was discouraged. By not forming strong attachments between teachers and children, teacher and child separation traumas were avoided. Graduate students were encouraged to work with each child and to gain experience and a broader
Implications

The children utilized in this study demonstrated the positive effects of early intervention. The results reaffirmed that carefully planned early intervention is effective in helping handicapped children reach their full potential by increasing their level of development in all areas of child development.

Teachers should not assume that a child will learn on his/her own. Through the strategies implemented, the curriculum utilized, and the organization of the classroom, children demonstrated acceleration of their rate of development and learned at a faster rate. Teacher expectations of the child's abilities increased as the child continued to make developmental gains.

Parental involvement in their child's educational program had far reaching effects in all areas of the home and community. As parents learned to implement strategies designed by the program staff outside the program, developmental gains occurred at a faster rate (although this impact was not studied separately), reinforcing the parent as well as the child.

Researchers can replicate this study with a larger number of children in an educational program for a longer period of time to test the model's effectiveness. The
setting of the early intervention program was a factor in producing the children's developmental gains demonstrated through this research. The individual and group activities that focused on each area of development, the consultation services provided to the teachers and parents, as well as parent involvement combined to produce the developmental growth of each child. By following this research with a carefully controlled study, similar results will further confirm the effectiveness of early intervention with young handicapped children.

Numerous studies have been conducted that demonstrate the efficacy of early intervention, and all the studies concur that early intervention is effective. Studies have reported similar results while utilizing different service delivery methods. Utilizing the most effective portions from various programs could increase the quality of educational services for young handicapped children. By increasing the number of programs available, services would be provided to more children in need of early intervention. Resources should now be focused on increasing the quality and number of intervention services instead of being spent on reaffirming that early intervention is effective.

**Limitations**

From the point of view of researchers who strongly
believe in conducting studies with carefully selected experimental and control groups, the most obvious flaw in this research was the lack of a control group with which to compare the developmental gains made by children as a result of intervention. The use of a control group with handicapped children is considered unethical and is even illegal in most states. Besides, handicapped children formulate an extremely heterogeneous group. Even if they have the same classification (e.g. cerebral palsy or Down's Syndrome), the selection of a control group is very difficult if not impossible. All children in need of intervention services deserve the chance to fulfill their potential. Withholding services in order to establish a control group cannot be justified and is unacceptable to early childhood interventionists.

Data for this study was gathered from seven years of program files compiled by numerous graduate students. It was not possible to evaluate interrater reliability. The individual styles of assessing and teaching may have resulted in inconsistent reporting and therefore effected the results to some extent, although this bias was controlled through compilation of team reports for each child.

There was no control over or documentation of intervention services that the child received outside of the program. Some of the children may have received
speech therapy, physical therapy, or other educational services that may have had an impact on developmental gains.

There was also no control over or documentation of parental compliance with suggestions of activities to do at home. Some parents may have been more motivated regarding intervention goals, followed-through with suggestions outside the program, and had more impact on the child's developmental gains that other parents who were not or could not be more involved.

The small sample size reported positive results in all areas of development. If a larger sample size was utilized in this study, the results may have been different and not as significant.

Conclusion & Summary

All children that attended the educational program made significant developmental progress at posttest when compared to entry across all domains. The progress definitely was not attributed to developmental maturation because it was accounted for by using the Rosenberg et al (1987) change in rate of development formula. By accounting for the impact of maturation over time, a stronger case for early intervention services was provided.

The three major hypothesis and the thirty-three sub-hypothesis were supported in this study. All individual
children, subgroups of children based on categorical handicapping conditions, and the children as a whole group made developmental gains. All children, regardless of their impairment or disability made gains in all areas of development while attending the educational program. The various methods and styles implemented by the graduate students resulted in positive gains made by each child.

The results of this study support the rationale for early intervention. The services provided through early education programs have a very strong potential to remediate developmental problems and accelerate the child's rate of development; therefore, increasing the quality of life for the disabled child, and promoting better family conditions.
References


Beginning of Year Report

Model Demonstration Developmental Learning Center

Name of Child: __________________________ Reported by: __________________________

Date of Birth: 10-4-83 Assessment date: October 15, 1986

Chronological Age: 3.0 years Type of Report: Beginning of the Year

Is enrolled at MDDLC for the first time. She is three years old and has a small physical build. Jennifer is fairly resistant to structured classroom activities and usually rejects teacher redirection.

She has very limited speech and is able to communicate only a few words: "mama", "mine", "buy" and "no". She jabbers constantly to make her thoughts and needs known.

Assessment information to determine present level of development included observations by Brigance Diagnostic Inventory of Early Development and Hawaii Early Learning Profile.

Gross Motor (2.8 years)

Can do:

- Stand on either foot momentarily (3.0)
- Walk backward three steps (2.0)
- Walk downstairs alternating feet while holding rail (4.0)
- Runs stiffly with some falling
- Jumps 4 consecutive jumps (4.0)
- Attempts hopping on either foot (2.6)
- Walk balance board with both hands held (2.0)
- Bounces and catches playground ball once with both hands (2.0)

Needs to:

- Stand on one foot for 5 seconds (4.0)
- Walk backward a distance of 2m (2.0)
- Walk forward heel/toe three steps (3.0)
- Run well without falling (2.0)
- Hop 2 hops on either foot
- Stand on balance board with both feet
- Bounces playground ball two or more times with both hands (3.0)
Beginning of the Year Report, p. 2

Fine Motor (2.5 years)

Can do:
- Sort dissimilar objects (3.6)
- Build tower of 5 blocks (2.0)
- Completes simple shape inset puzzle (2.0)
- Holds pencil with fingers, hand not fist (2.0)
- Snips or makes small cuts in paper (2.6)

Needs to:
- Unscrew and screw on one inch lid (3.6)
- Build tower of 6-9 blocks (3.0)
- Complete inset puzzle of 3-5 pieces (4.0)
- Draws a ball/apple when shown (3.0)
- Hold paper for cutting (2.6)

Self Help (3.8 years)

Can do:
- Holds and manipulates spoon and fork (4.0)
- Undresses self except for pulling over garments (2.0)
- Puts on socks and pulls up garments (4.0)
- Totally cares for own toileting needs (4.0)

Needs to:
- Use napkin without teacher direction (4.0)
- Remove pull over garments (3.0)
- Know which shoe goes on which foot (4.0)
- Button small front buttons (3.0)

Receptive Language (2.8 years)

Can do:
- Follows verbal directions "... in the box" "... under the.." "bring me the..." (3.0)
- Points to pictures including apple, cup (2.6)

Needs to:
- Follow more complex verbal directions. "...by the chair." (3.0)
- Point to pictures including airplane, leaf (2.0)
  car, nail, pencil (3.0)

Expressive Language (2.0 years)

Can do:
- Responds to and makes verbal greetings (3.0)
- Participates in singing games (2.6)
- Says 3 words other than "mama "dada" (1.0)
- Name picture of dog (1.6)

Needs to:
- Deliver simple messages (3.0)
- Know a few songs completely (3.0)
- Name common objects shown (1.0)
- Name picture of cat, key, girl, man, airplane, apple, leaf (2.0)
- Name picture of cup, boy, car, nail, pencil, wagon, sock (3.0)
Beginning of the Year Report, p. 3

**Cognitive (3.4 years)**
Can do:
- Point to body parts including hand, ears, head, legs, arms (2.0)
- Matches red, blue, green, yellow orange, purple, brown (3.0)
- Sort by color, shape (4.0)

Needs to:
- Point to body parts including thumb, toes, neck, stomach, chest, back, (3.0)
- Point to red, blue, green, yellow, (3.0) Identify quantitative concept little/big, short/long (3.0)
- Identify positional concepts up/down out/in

**Social/Emotional (2.8 years)**
Can do:
- Says no, submits anyway (2.6)
- Values own property; uses word "mine" (2.6)
- Shows independence (3.0)

Needs to:
- Initiate own play (3.0)
- Participate in circle activities (2.6)
# INDIVIDUAL EDUCATION PLAN

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<td></td>
<td>3. To develop positional</td>
<td>1. Identify positional concepts</td>
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<tr>
<td></td>
<td>concepts</td>
<td>up/down, in/out</td>
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</tr>
</tbody>
</table>

109
**INDIVIDUAL EDUCATION PLAN**

**NAME OF CHILD**

**DATE OF BIRTH**
10/04/83

**AGE**
3.0

**PARENTS' NAMES**

**ADDRESS**

**PHONE**

**DATE OF IEP**
October 15, 1986

**REPORT BY**

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<table>
<thead>
<tr>
<th>SENT LEVEL OF PERFORMANCE</th>
<th>GOALS</th>
<th>LEARNING OBJECTIVES</th>
<th>EVALUATION CRITERIA</th>
<th>PERSON RESPON.</th>
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</thead>
<tbody>
<tr>
<td>GROSS MOTOR</td>
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<tr>
<td>Current level of</td>
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<tr>
<td>performance 2.8 years</td>
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<tr>
<td>can stand on either</td>
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<td>Teachers &amp;</td>
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<tr>
<td>foot momentarily; walks</td>
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<td>Parents</td>
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<td>backward three steps;</td>
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<tr>
<td>walks downstairs</td>
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<td>alternating feet while</td>
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<td>holding rail; runs</td>
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<td>stiffly w/some falling;</td>
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<tr>
<td>jumps 4 consecutive jumps;</td>
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<tr>
<td>attempts hopping on</td>
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<tr>
<td>either foot; walks</td>
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<td>balance board w/both hands</td>
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<td>held; bounces and catches</td>
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<td>playground ball once w/both</td>
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<tr>
<td>hands</td>
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<tr>
<td>FINE MOTOR</td>
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<tr>
<td>Current level of</td>
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<tr>
<td>performance 2.5 years</td>
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<tr>
<td>sorts dissimilar objects;</td>
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<tr>
<td>builds tower of 6-9</td>
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<tr>
<td>blocks; completes simple</td>
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<tr>
<td>inset puzzle; holds pencil</td>
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<tr>
<td>w/fingers, hand not</td>
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<tr>
<td>pised; snips or makes</td>
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<tr>
<td>small cuts in paper</td>
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<tr>
<td>1. To develop eye/finger/</td>
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<tr>
<td>hand manipulative skills</td>
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<tr>
<td>1. Build tower of 6-9</td>
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<tr>
<td>blocks (4-87)</td>
<td></td>
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<tr>
<td>1. Complete simple inset</td>
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<tr>
<td>puzzle of 3-5 pieces</td>
<td></td>
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<tr>
<td>1. Imitate circle,</td>
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<tr>
<td>horizontal and diagonal</td>
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<tr>
<td>lines (4-87)</td>
<td></td>
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</tr>
<tr>
<td>1. Draw a ball/apple when</td>
<td></td>
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<tr>
<td>shown how</td>
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<tr>
<td>holds pencil for</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>cutting (3-87)</td>
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</tbody>
</table>
## INDIVIDUAL EDUCATION PLAN

**NAME OF CHILD**

**DATE OF BIRTH**

**AGE**

**PARENTS' NAMES**

**ADDRESS**

**PHONE**

**DATE OF IEP**

**REPORT BY**

<table>
<thead>
<tr>
<th>SENT LEVEL OF PERFORMANCE</th>
<th>GOALS</th>
<th>LEARNING OBJECTIVES</th>
<th>EVALUATION CRITERIA</th>
<th>PERSON RESPONSIBLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOCIAL/EMOTIONAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current level of</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>performance 2.8 years</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>says no, but submits</td>
<td></td>
<td></td>
<td>Brigance Diagnostic</td>
<td>Teachers &amp;</td>
</tr>
<tr>
<td>anyway; values own</td>
<td></td>
<td>1. Participate in</td>
<td>Inventory of Early</td>
<td>Parents</td>
</tr>
<tr>
<td>property and uses word</td>
<td></td>
<td>circle activities</td>
<td>Childhood Development</td>
<td></td>
</tr>
<tr>
<td>'mine'; shows</td>
<td></td>
<td>(2-87)</td>
<td>Hawaii Early</td>
<td></td>
</tr>
<tr>
<td>independence</td>
<td></td>
<td>2. Follow simple</td>
<td>Learning Profile</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>directions w/out</td>
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<td></td>
<td>resistance</td>
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<td></td>
<td></td>
<td>3. Initiate own</td>
<td>Portage Guide to</td>
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<td></td>
<td></td>
<td>play (3-87)</td>
<td>Child Development</td>
<td></td>
</tr>
</tbody>
</table>
### Individual Educational Program

**Objectives**

<table>
<thead>
<tr>
<th>Gross motor</th>
<th>1. Attempts to stand on one foot w/ no help</th>
<th>2. Stands on one foot momentarily</th>
<th>3. Walk in classroom w/out tripping 3 consecutive days</th>
<th>4. Walk backward 3 steps</th>
<th>5. Step onto playground cement w/out falling 3 consecutive days</th>
<th>6. Jumps 3 consecutive jumps (4 ft)</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

**Criteria for Evaluation** (see accompanying key)

I agree with the Individual Education Program.

Parent/Guardian ____________________________
**MODEL DEMONSTRATION DEVELOPMENTAL LEARNING CENTER**

**INDIVIDUAL EDUCATIONAL PROGRAM**

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>Date (1/15/62 - 1/13/63)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receptive language.</td>
<td></td>
</tr>
<tr>
<td>Points to head, ears, eyes, nose, mouth, hair</td>
<td></td>
</tr>
<tr>
<td>1. Will perform tasks w/ familiar objects:</td>
<td></td>
</tr>
<tr>
<td>a. Put — on the chair</td>
<td></td>
</tr>
<tr>
<td>b. Come to me</td>
<td></td>
</tr>
<tr>
<td>c. Give it to me</td>
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<tr>
<td>d. Sit here</td>
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<tr>
<td>e. Put it in the box</td>
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<tr>
<td>f. Put it under the table</td>
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<tr>
<td>2. Will perform tasks w/ 2 part directions:</td>
<td></td>
</tr>
<tr>
<td>a. Pick up the — and bring it to me.</td>
<td></td>
</tr>
<tr>
<td>b. Get the — and put it on the table</td>
<td></td>
</tr>
</tbody>
</table>

**CRITERIA FOR EVALUATION (see accompanying key)**

**I AGREE WITH THE INDIVIDUAL EDUCATION PROGRAM.**

Parent/Guardian ____________________________

110
CHILD'S NAME _________________________________ DATE STARTED __________________ DATE ENDED __________________

INDIVIDUAL EDUCATIONAL PROGRAM

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>07/15</th>
<th>07/19</th>
<th>07/23</th>
<th>07/27</th>
<th>08/03</th>
<th>08/07</th>
<th>08/14</th>
<th>08/21</th>
<th>08/28</th>
<th>09/04</th>
<th>09/08</th>
<th>09/15</th>
<th>09/22</th>
<th>09/29</th>
<th>10/06</th>
<th>10/13</th>
<th>10/20</th>
<th>10/27</th>
<th>11/03</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expressive Language</td>
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<tr>
<td>1. Says own name clearly</td>
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<tr>
<td>2. Ask for food at snack</td>
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<tr>
<td>3. Ask for drink at snack</td>
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<tr>
<td>4. Name 3 of 5 familiar objects</td>
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<tr>
<td>5. Verbally greet teachers, classmates etc.</td>
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<tr>
<td>Self-help skills</td>
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<tr>
<td>1. Wash &amp; dry hands</td>
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<td>2. Attend to toileting needs</td>
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<tr>
<td>3. Puts on own sock</td>
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<td>4. Puts on own shoe</td>
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<td>5. Unsnaps front</td>
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</table>

CRITERIA FOR EVALUATION (see accompanying key) I AGREE WITH THE INDIVIDUAL EDUCATION PROGRAM.

Parent/Guardian __________________________

111
## OBJECTIVES

<table>
<thead>
<tr>
<th>Cognitive</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Identifies body parts - arms, fingers, thumb</td>
</tr>
<tr>
<td>- neck, stomach, chest</td>
</tr>
<tr>
<td>2. Match objects by color - red, blue, green, yellow, orange, brown</td>
</tr>
<tr>
<td>3. Aware of class routine - chairs for circle, table for snack, lineup for outside</td>
</tr>
<tr>
<td>4. Matches identical simple pictures of objects</td>
</tr>
</tbody>
</table>

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**CRITERIA FOR EVALUATION (see accompanying key)**

**I AGREE WITH THE INDIVIDUAL EDUCATION PROGRAM.**

Parent/Guardian ___________________________
### Model Demonstration Developmental Learning Center

**Child's Name:** [Blank]

**Date Started:** [Blank]

**Date Ended:** [Blank]

### Individual Educational Program

<table>
<thead>
<tr>
<th>Date</th>
<th>1/5</th>
<th>1/6</th>
<th>1/7</th>
<th>1/8</th>
<th>1/9</th>
<th>1/10</th>
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</thead>
<tbody>
<tr>
<td><strong>Objectives</strong></td>
<td></td>
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</tr>
</tbody>
</table>

#### Social Skills - Emotional

1. Remains at table during entire snack time - [Blank]

2. Separates easily from mother at bedtime - [Blank]

3. Leaves classroom setting without display of temper - [Blank]

4. Participates in circle on consecutive days - [Blank]

#### Attention Span

1. Attends to task for 60 seconds - [Blank]

2. Parallel play for 3 minutes - [Blank]

**Criteria for Evaluation (see accompanying key)**

- [Blank]

**I Agree with the Individual Education Program.**

**Parent/Guardian:** [Blank]
MODEL DEMONSTRATION DEVELOPMENTAL LEARNING CENTER
SPEECH THERAPIST SCREENING

Date: October 13, 1986

Child: __________________________
Date of Birth: 10/04/83
Chronological Age: 3.0

The therapist worked with the observation room. She was seated on teachers lap on the floor of

RECEPTIVE LANGUAGE

1. When shown pictures was asked "Where's the dog?" "Where's the telephone?" 
   Made non-verbal response by directing eye contact to appropriate picture
2. When asked "Where's the boy taking a bath?" made no response
3. When asked to identify colors, pushed the colored blocks and sticks away
4. Wouldn't "play ball"
5. Pushed away telephone and doll
6. When asked to count to five made no response*

*At this point candy was brought in as a reinforcer

EXPRESSIVE LANGUAGE

1. Was asked If she wanted a candy, responded "no"
2. Was asked to say "I want candy". Made some verbal sound in response and was given candy
3. Was shown book of puppies and offered candy if she would say puppy.
   No response
4. Doggies say "woof". What do kittens say? No response
5. Expressed interest In toy dog Josette was holding; reached for dog.
   "You want dog? Say dog!"
   Made some response (not understandable) Was given dog
6. Set of ball and jacks introduced. said "earrings" When asked "Do these look like earrings?" replied "Mama buy"
7. Story of Three Bears Introduced. No response
RECOMMENDATIONS
1. The screening was not valid; full evaluation recommended
2. Need to break through behavior
3. Have Jennifer ask for toys, snack, and needs in class
4. Talk to her; she understands concepts
5. Have her sit next to teacher, not on teacher's lap
6. Work w/Jennifer in small groups w/other children to model from
OCCUPATIONAL THERAPY CONSULT

NAME:
BIRTHDATE: 10-4-83
DATE: 3-23-87

Your child, was given an occupational therapy screening as part of his/her preschool program. Following are the observations and recommendations which were made.

OBSERVATIONS:
good fine motor - strings beads
no color recognition - by name
matrices colors
requires assistance in cutting
tower of 1st blocks = 7
good tactile discrimination
pincer grasp - 34 packets in bottle in 10 sec.
adequate righting & equilibrium reactions (for balance)
questionable low tone
adequate protective extension responses
jumps

RECOMMENDATIONS:
demonstrates age appropriate
gross & fine motor skills. Continue
with age appropriate motor &
cognitive activities to promote
learning.

Please refer to the preschool teacher for further clarification or explanations if necessary.
Thank you.
End of the Year Report

MODEL DEMONSTRATION DEVELOPMENTAL LEARNING CENTER

Date: May 21, 1987
Child: ___________________________________________________________
Reported by: ____________________________________________________
Date of Birth: 10-04-83
Chronological Age: 3.7 years
Report Date: May 15, 1987

has been enrolled at MDDL from 9-15-86 through 5-14-87. When
began in the program, she had extremely limited verbalization, with her
vocabulary consisting of only four words. was initially very non-
compliant and had a hard time adjusting to transitions within the classroom.
She frequently displayed temper tantrums, especially when dealing with her
mother. She also exhibited gross motor deficits, particularly in the area
of balance.

has made many strides this year. Her verbalization has increased to
the point that she communicates in sentences averaging four words; she relates
events using sequence and closure; relays messages to other students and
teachers; and follows directions well. She has become much more compliant to
teacher direction and follows classroom guidelines with regularity.

The following comparisons are made between beginning level of
development and her current assessed level using the Brigance Diagnostic
Inventory of Early Development and the Hawaii Early Learning Profile.

GROSS MOTOR

Could do: 2.8 years
Walk backward three steps (2.0)
Runs stiffly w/some falling (1.0)
Attempts hopping either foot (2.6)
Walk balance board w/both
hands held (2.0)

Can do: 3.1 years
Walk backward 2m (2.3)
Runs well w/out falling (2.0)
2 hops either foot (3.0)
Attempts to walk balance board w/out
having hands held
Attempts rhythmic movement w/hand
instruments (5.0)
End of Year Report
Page 2

FINE MOTOR
Could do: 2.5 years
Sort dissimilar objects (3.6)
Build tower of 5 blocks (2.0)
Complete simple shape inset puzzle (2.0)
Holds pencil w/fingers, hand not fisted (2.0)
Can do: 3.5 years
Sort greater number of dissimilar objects
Build tower of 10 blocks (3.6)
Complete inset puzzle of 3-5 pieces (4.0)
More relaxed grip on pencil held w/fingers
Draws ball/apple when shown (3.0)

SELF-HELP
Could do: 3.8 years
Undress self except for pulling over garments (2.0)
Totally care for own toileting needs
Holds and manipulates spoon and fork (4.0)
Can do: 4.0 years
Attempts to put on pull-over garments
Continues to care for own toileting needs
Manipulates spoon and fork w/greater accuracy and less spills
Use napkin w/out teacher direction (4.0)
Wipes nose w/out verbal clue (4.0)
Adjusts water temperature (4.0)

RECEPTIVE LANGUAGE
Could do: 2.8 years
Follow verbal directions "...in the box" "...under the..." "bring me the..." (3.0)
Points to pictures including apple, cup (2.6)
Can do: 3.8 years
Follows verbal directions "...by the chair" "In front" (4.0)
Points to pictures when named including: boy, car, sock, fish (3.6)
Follows 3-part teacher directions (4.0)

EXPRESSION LANGUAGE
Could do: 2.0 years
Responds to and makes verbal greetings (3.0)
Participates in singing games (2.6)
Says 3 words other than 'mama' 'dada' (1.0)
Names picture of dog (1.6)
Can do: 3.5 years
Makes verbal greetings by calling teachers/children by name
Knows/sings a few songs completely (3.0)
Vocabulary of over 100 words
Names when pointed to: cat, girl, man, airplane, apple, cup, boy, car, sock, fish (3.6)
Articulates in initial position w/prompting: p,b,m,d,t,g,f (4.0)
COGNITIVE

Could do: 3.4 years

Point to body parts including hand, ears, head, legs, arms (2.0)
Matches red, blue, green, yellow, orange, purple, brown (3.0)
Sort by color, shape (4.0)

Can do: 4.5 years

Point to body parts including thumb, stomach, neck, toes, back, knee (3.6)
Matches colors including black, white
Sort by color, shape, size (5.0)

SOCIAL-EMOTIONAL

Could do: 2.8 years

Says no, submits anyway (2.6)
Values own property; uses word 'mine' (2.6)
Shows independence (3.0)

Can do: 3.1 years

Follows teacher direction w/out saying no (3.6)
Using own initiative, shares w/others

Continues to show independence
Takes pride in own accomplishments (3.0)
Initiates own play (3.0)
Participates in circle: raises hand, asks questions (3.0)

RECOMMENDATION

It is recommended that remain in MDDLC or a similar program where she can receive individualized attention as well as work in small group settings. It is important to continue work on language development under the direction of a speech therapist. Gross motor skills should be further developed. works best in a structured environment with specific guidelines established.
<table>
<thead>
<tr>
<th>DATE</th>
<th>ANECDOTAL RECORDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/30</td>
<td>Started out very well today.</td>
</tr>
<tr>
<td></td>
<td>Began independently, good interaction with others.</td>
</tr>
<tr>
<td></td>
<td>Very concerned about Andrew.</td>
</tr>
<tr>
<td></td>
<td>Teacher displaying a lot more negative behavior towards children/kitchen.</td>
</tr>
<tr>
<td></td>
<td>Imitating Andy @ the living room.</td>
</tr>
<tr>
<td></td>
<td>Special 4 knife in classroom @ Green.</td>
</tr>
<tr>
<td></td>
<td>Left a note addressed to teacher stating she felt it was all right in their game of her own.</td>
</tr>
<tr>
<td></td>
<td>Left on a specific note.</td>
</tr>
<tr>
<td>10/1</td>
<td>Absent today.</td>
</tr>
<tr>
<td>10/2</td>
<td>Did very well with new children in class today.</td>
</tr>
<tr>
<td></td>
<td>Began to cooperate more easily with large class.</td>
</tr>
<tr>
<td></td>
<td>Followed directions with few wrinkles and no fighting.</td>
</tr>
<tr>
<td></td>
<td>Became very frustrated on playground when she couldn't have the bike she wanted. She took it from another child.</td>
</tr>
<tr>
<td></td>
<td>Usually withdrawn from teacher/children until a bike became available.</td>
</tr>
<tr>
<td></td>
<td>Worked for 15 min. Left for rest of the entire time. Not well in circle today - but didn't participate in all activities. Just to help Andy, tho.</td>
</tr>
<tr>
<td>10/6</td>
<td>Came in circle today. sat in morning circle but did not participate. Sick to do individual assessment. Was not cooperative - too many distractions. Stayed in chair during snack time.</td>
</tr>
<tr>
<td>10/7</td>
<td>Absent</td>
</tr>
<tr>
<td>10/8</td>
<td>Absent</td>
</tr>
<tr>
<td>DATE</td>
<td>ANECDOtal RECORDS</td>
</tr>
<tr>
<td>------</td>
<td>------------------</td>
</tr>
<tr>
<td>10/20</td>
<td>Participated in discussion of class rules. Said many words to express self. Not able to understand all. Is saying. Withdrew from circle. Joined in other time to sing about: in &quot;Row, Row&quot;. Participated after this song in &quot;Wheels on Bus&quot;.</td>
</tr>
<tr>
<td></td>
<td>Kept leaving group during matching colors to go play.</td>
</tr>
<tr>
<td></td>
<td><em>I</em> kept bringing her back; she objected. She would come &amp; join in sat in chair during snack. Had to ask for colored circles to make caterpillar.</td>
</tr>
<tr>
<td></td>
<td><em>I</em> asked for 5 circles. Wouldn't continue activity <em>of</em> group. <em>Said</em> &quot;blue&quot; <em>very</em> plangly. &quot;red&quot; &quot;yellow&quot; &quot;green&quot;. Hit baby. While <em>I</em> was holding him: &quot;You are never rough with <em>me</em>.&quot; Ignored <em>I</em> while attending to. <em>I</em> kept trying to get more attention. When she couldn't she joined group story -</td>
</tr>
<tr>
<td></td>
<td>Wanted instruments. <em>I</em> handed music. Used rhythm sticks while sitting. Wouldn't match cards.</td>
</tr>
<tr>
<td>10/23</td>
<td>Worked at putting O, O, A, circles in shapes. <em>Teacher</em> needed teacher assistance to do this.</td>
</tr>
<tr>
<td></td>
<td>Good participation in singing.</td>
</tr>
<tr>
<td></td>
<td>Scooted on scooter board. Used her feet to propel herself forward &amp; backwards.</td>
</tr>
</tbody>
</table>
**MDLAC-AM AND PM SCHEDULE FOR WEEK OF JUNE 20-23-1988**

<table>
<thead>
<tr>
<th>TIME</th>
<th>ACTIVITY</th>
<th>DEVELOPMENTAL OBJECTIVE</th>
<th>PROCEDURE</th>
<th>MATERIALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30-9:00</td>
<td>guided play</td>
<td>language, social</td>
<td>greet children and parents, guide child to activity</td>
<td>blocks, puzzles, games, action toys, pegs and pegboards, crayons playdough, books, music tapes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>exploration, self-</td>
<td>observe interaction with other children/adults, activity selected. Child</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>direction, fine/gross</td>
<td>will clean-up at end of activities with adults help</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>motor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9:00-9:15</td>
<td>circle</td>
<td>language, social</td>
<td>children grouped in cube chairs or on floor. Sing &quot;Who came to school today&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>cognitive</td>
<td>place sticker by name on chart. Children participate in songs and fingerplays, following directions, and attending in group</td>
<td></td>
</tr>
<tr>
<td>9:20-9:45</td>
<td>small group</td>
<td>language, fine</td>
<td>see attached instruction page for instructions</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>motor, cognitive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9:50-10:00</td>
<td>toileting</td>
<td>self-help, hygiene</td>
<td>take those who are able to the bathroom, diaper those who are not able.</td>
<td></td>
</tr>
<tr>
<td>10:00-10:20</td>
<td>outside/large</td>
<td>language, gross motor,</td>
<td>monitor child's activities on playground, encourage parallel and cooperative</td>
<td>balance beam, swings, balls, sand toys, bubbles, bikes</td>
</tr>
<tr>
<td></td>
<td>group</td>
<td>social, language</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:20-10:30</td>
<td>come inside, wash</td>
<td>language</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:30-10:45</td>
<td>snack and clean-up</td>
<td>nutrition, self-help</td>
<td>nutrition, self-help, skills and table etiquette are focused, children are</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>responsible for their own</td>
<td></td>
</tr>
<tr>
<td>TIME</td>
<td>ACTIVITY</td>
<td>DEVELOPMENTAL OBJECTIVE</td>
<td>PROCEDURE</td>
<td>MATERIALS</td>
</tr>
<tr>
<td>------------</td>
<td>-------------------</td>
<td>--------------------------</td>
<td>------------------------------------------------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td>10:30-10:45</td>
<td>snack and clean-up</td>
<td>self-help, social</td>
<td>individual clean-up</td>
<td></td>
</tr>
<tr>
<td>10:50-11:10</td>
<td>art/crafts</td>
<td>fine motor, language, cognitive</td>
<td>see attached instruction page for instructions</td>
<td></td>
</tr>
<tr>
<td>11:15-11:30</td>
<td>ready for home</td>
<td>self-help, language, social</td>
<td>help children gather materials for home</td>
<td>discuss child's day with parent and say good bye to each child.</td>
</tr>
</tbody>
</table>
Week: June 20-23-1988
small group instruction
9:20-9:45

GROUP ONE:

TEACHER:

Monday: Discuss with children the shape circle. Have examples of things that are round-ball,record,plate,wheel of toy truck. Have them touch and trace shape, discuss texture. Skill Sheet: trace and color all the circles on the paper red. When finished, have child count how many circles were on the paper. Using magazines, have the child find 5 pictures of things that are round or a circle and cut and paste them on paper. When they are finished, have them tell you what the pictures were and print the name of the picture next to it. Have them copy circles on paper.

Tuesday: Discuss with children the shape square. Have examples of things that are square-book, block, piece of puzzle crayon box. Continue with procedure of Monday, this time color all squares blue. Using magazines, Find 5 pictures that are square, follow same procedure. Have them copy squares on paper.

Wednesday: Discuss with children the shape triangle. Have examples of things that are triangle-block,puzzle piece,making a triangle on paper. Continue, this time color all triangles green. Using magazines, find 5 pictures that are triangle, follow same procedure. Have them copy triangles on paper.

Thursday: Discuss with children the shape rectangle. The table, block piece, shape of clay. Continue this time color rectangles orange. Follow procedure cut out 5 pictures that are rectangle and paste , label what they are, copy rectangles on paper. Using the Tap-Tap shapes game call on each child to pick up a shape and hammer it on the board. Have them use sentences: This is a red circle, etc. Have each child find 4 things in the room-circle, 1 square, 1 triangle, 1 rectangle and bring them to the table and tell what they found. If children finish quickly have them use the lacing tiles

MATERIALS: magazines, paper, scissors,paste, tap-tap game,red, blue, green, orange crayon, markers, examples of things circle, square, rectangle, triangle
Week: June 20-23-1988
small group instruction
9:20-9:45
GROUP TWO:
TEACHER:

Monday: Cutting out playdough using the round cutters only.
Have them roll the dough into a ball, take ball of dough and
flatten dough on table, take round cutter and press into dough
to make a circle shape. Take child's finger and trace it around
the shape of the dough. Have child say round.
String round rubber disks. Repeat word round and that they
are stringing the round ones.

Tuesday: Stack square blocks make a block tower of 3 to 5 blocks.
Make a large square using 4 square blocks.
Stack square foam blocks. Have child trace the shapes

Wednesday: Sting triangle rubber disks
String circle rubber disks
Have child trace triangles

Thursday: Stack rectangle blocks make a block tower of 3 or more
Use Colors and Shapes book show child pictures say shape
to child have child repeat what you said.

MATERIALS: playdough, cutter shaped circle, circle and triangle rubber
disk's and strings, square and rectangle blocks, square
foam blocks, Color and Shapes book
Week: June 20-23-1988
Small group instruction
9:20-9:45

GROUP THREE:

TEACHER:

Monday: Trace shapes of circles using nesting cups on paper, if able they may color the shape inside
Stack nesting cups
Use Color and Shapes book have child point to round objects have child say name of object and what it is used for

Tuesday: Using blocks trace square shapes on paper place square shapes on puzzle form have child find a square object in the room

Wednesday: String beads that are round trace triangle shapes on paper use color and Shapes book to find shapes that are round, square, and triangles. Have them identify the pictures

Thursday: Stack rectangle blocks to make a block tower of 5 or more Using basic shapes puzzle have child match shape to the form.
Have child point to the shape you say, have child say shape name Use playdough to make dough into the 4 shapes

MATERIALS: playdough, cutters, nesting cups, crayons, pencils, paper, square and rectangle blocks, beads and strings, color and shape book, shape puzzle.
### B. GROSS MOTOR SKILLS AND BEHAVIORS

<table>
<thead>
<tr>
<th>B-1</th>
<th>27-9</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standing:</strong></td>
<td></td>
</tr>
<tr>
<td>1. Stands with broad stance.</td>
<td></td>
</tr>
<tr>
<td>2. Stands with normal stance.</td>
<td></td>
</tr>
<tr>
<td>3. Stands on one foot with one hand held by another person.</td>
<td></td>
</tr>
<tr>
<td>4. Stands on either foot with one hand held.</td>
<td></td>
</tr>
<tr>
<td>5. Attempts to pick up object from floor and then re-erects.</td>
<td></td>
</tr>
</tbody>
</table>

**Developmental Age:** 12, 30, 60

### Notes:

<table>
<thead>
<tr>
<th>B-2</th>
<th>30-3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Walking:</strong></td>
<td></td>
</tr>
<tr>
<td>1. Walks with broad stance.</td>
<td></td>
</tr>
<tr>
<td>2. Walks with knees slightly bent and shoulders slightly hunched.</td>
<td></td>
</tr>
<tr>
<td>3. Walks holding hands out for balance rather than at side.</td>
<td></td>
</tr>
<tr>
<td>4. Walks with hands swinging at side.</td>
<td></td>
</tr>
<tr>
<td>5. Walks sideways.</td>
<td></td>
</tr>
</tbody>
</table>

**Developmental Age:** 12, 30, 60

### Notes:

<table>
<thead>
<tr>
<th>B-3</th>
<th>34-5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stairs and Climbing:</strong></td>
<td></td>
</tr>
<tr>
<td>1. Creeps up stairs.</td>
<td></td>
</tr>
<tr>
<td>2. Creeps down stairs backward.</td>
<td></td>
</tr>
<tr>
<td>3. Climbs onto furniture such as a low couch.</td>
<td></td>
</tr>
<tr>
<td>4. Climbs in and out of an adult chair.</td>
<td></td>
</tr>
<tr>
<td>5. Walks up stairs with one hand held.</td>
<td></td>
</tr>
</tbody>
</table>

**Developmental Age:** 12, 30, 60

### Notes:

*Disappearing behaviors, present only at this level of development (see page 3 in inventory)
# C. FINE MOTOR SKILLS AND BEHAVIORS

## C-3

<table>
<thead>
<tr>
<th>69</th>
<th>Puzzles:</th>
</tr>
</thead>
<tbody>
<tr>
<td>2+</td>
<td>Completes simple inset puzzle (circle, triangle or square).</td>
</tr>
<tr>
<td>2+</td>
<td>Completes inset puzzle of how many pieces? (circle):</td>
</tr>
<tr>
<td>3-5</td>
<td>6-10 11-15 16-20</td>
</tr>
<tr>
<td>2+</td>
<td>Completes puzzle, not inset, of how many pieces? (circle):</td>
</tr>
</tbody>
</table>

### Developmental Age: 2+

### Notes:

## C-4

<table>
<thead>
<tr>
<th>70-3</th>
<th>Pre-Handwriting:</th>
</tr>
</thead>
<tbody>
<tr>
<td>2+</td>
<td>1. Holds crayon or pencil in fist and makes incidental marks.</td>
</tr>
<tr>
<td>2+</td>
<td>2. Imitates scribble.</td>
</tr>
<tr>
<td>2+</td>
<td>3. Makes purposeful marks with crayon (may go off page).</td>
</tr>
<tr>
<td>2+</td>
<td>Scribbles and seldom goes off page.</td>
</tr>
<tr>
<td>5</td>
<td>Traces along vertical line.</td>
</tr>
<tr>
<td>6+</td>
<td>6. Holds pencil/crayon with fingers, perhaps incorrectly, with hand not fist.</td>
</tr>
<tr>
<td>6+</td>
<td>7. Traces along horizontal line.</td>
</tr>
<tr>
<td>6+</td>
<td>8. Traces letters.</td>
</tr>
<tr>
<td>6+</td>
<td>10. Colors within lines.</td>
</tr>
<tr>
<td>6+</td>
<td>11. Traces letters.</td>
</tr>
<tr>
<td>6+</td>
<td>12. Makes circles between writing lines.</td>
</tr>
<tr>
<td>6+</td>
<td>13. Makes vertical lines between writing lines.</td>
</tr>
</tbody>
</table>

### Developmental Age: 6+

### Notes:

## C-5

<table>
<thead>
<tr>
<th>74</th>
<th>Draw A Person:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of body parts present in picture:</td>
<td></td>
</tr>
<tr>
<td>Picture includes: head legs eyes nose mouth arm trunk hands ears neck feet</td>
<td></td>
</tr>
</tbody>
</table>

### Developmental Age: 7+

### Notes:

## C-6

<table>
<thead>
<tr>
<th>75-7</th>
<th>Designs:</th>
</tr>
</thead>
<tbody>
<tr>
<td>2+</td>
<td>Imitates:</td>
</tr>
<tr>
<td>2+</td>
<td>V</td>
</tr>
<tr>
<td>2+</td>
<td>(d)</td>
</tr>
<tr>
<td>2+</td>
<td>(e)</td>
</tr>
<tr>
<td>2+</td>
<td>(f)</td>
</tr>
<tr>
<td>2+</td>
<td>(g)</td>
</tr>
<tr>
<td>2+</td>
<td>(h)</td>
</tr>
</tbody>
</table>

### Developmental Age: 7+

### Notes:

### Copies:

### Developmental Age: 7+

### Notes:
# D. SELF HELP SKILLS

<table>
<thead>
<tr>
<th>Task</th>
<th>Developmental Age: 12</th>
<th>Notes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Washes hands with assistance.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Brushes teeth, with assistance.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Brushes teeth, without assistance.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Wipes nose, by request.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Adjusts water temperature.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Washes face, with assistance.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Washes hands, without assistance.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Task</th>
<th>Developmental Age: 14</th>
<th>Notes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Washes hands, with assistance.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Brushes teeth, with assistance.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Brushes teeth, without assistance.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Wipes nose, without assistance.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Task</th>
<th>Household Chores:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Feeds self.</td>
</tr>
<tr>
<td>2.</td>
<td>Helps with dressing.</td>
</tr>
<tr>
<td>3.</td>
<td>Helps with undressing.</td>
</tr>
<tr>
<td>4.</td>
<td>Helps with laundry.</td>
</tr>
<tr>
<td>5.</td>
<td>Helps with dishes.</td>
</tr>
</tbody>
</table>

**Notes:**
- **Cooperates in:** Changes in behavior over time.
- **Can be:** Independently managed.
- **Requires:** Assistance or supervision.
- **May require:** Supportive strategies or adaptations.

---

**D-9**

**D-9A**

**D-10**

**D-10A**

**D-11**

**D-11B**

**References:**
### F. SPEECH AND LANGUAGE SKILLS

#### F-5 131-4
**Verbal Direction:** Follows the following directions:

1. "...on the chair."  
2. "... sitting here."  
3. "...in the box."  
4. "Bring it to me."  
5. "...under the..."  
6. "...in front."  
7. "...beside..."  
8. "...above..."  
9. "...below..."  
10. "...behind..."

**Notes:**

#### F-6B 135-6
**Picture Vocabulary:** Points to when examiner names:

- **dog**
- **cat**
- **man**
- **airplane**
- **cup**
- **pencil**
- **wagon**
- **fish**

**Names when examiner points to:**

- **dog**
- **cat**
- **man**
- **airplane**
- **cup**
- **pencil**
- **wagon**
- **fish**

#### J-7 137-41
**Articulation of Sounds:**

<table>
<thead>
<tr>
<th>INITIAL POSITION</th>
<th>FINAL POSITION</th>
</tr>
</thead>
<tbody>
<tr>
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**Notes:**

#### F-8 142
**Repeats Numbers:**

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<th>(6-4)</th>
<th>(3-2-5)</th>
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<td>2-8-7</td>
<td>7-3</td>
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</tbody>
</table>

**Developmental Age:**

#### F-9 143-4
**Sentence Memory:**

Repeats sentence of how many syllables:

- **2**
- **4-6-8**

**Developmental Age:**

#### F-10 145-6
**Singing:**

- **1.** Tonation in voice.  
- **2.** Listens to music and rhymes.  
- **3.** Spontaneously hums and sings syllables.  
- **4.** Sings along with music, whether incoherently or off pitch.  
- **5.** Sings parts of songs spontaneously.  
- **6.** Participates in singing games.  
- **7.** Knows a few songs completely.  
- **8.** Physically interprets the mood of music.

**Developmental Age:**
## G. GENERAL KNOWLEDGE AND COMPREHENSION

### G-1  149-51

**Body Parts: A. Receptively:**

- **1.** mouth  
- **2.** feet  
- **3.** nose  
- **4.** hand  
- **5.** hair  
- **6.** tongue  
- **7.** teeth  
- **8.** skin  
- **9.** ears  
- **10.** head  
- **11.** legs  
- **12.** arms  
- **13.** fingers  
- **14.** thumb  
- **15.** neck  
- **16.** stomach  
- **17.** chin  
- **18.** chest  
- **19.** back  
- **20.** heel  
- **21.** elbow  
- **22.** fingernails  
- **23.** ankle  
- **24.** waist  
- **25.** hip

**Developmental Age:**

**Notes:**

### G-1a:3

**Body Parts: B. Expressively:**

- **1.** mouth  
- **2.** feet  
- **3.** nose  
- **4.** hand  
- **5.** hair  
- **6.** tongue  
- **7.** teeth  
- **8.** skin  
- **9.** ears  
- **10.** head  
- **11.** legs  
- **12.** arms  
- **13.** fingers  
- **14.** thumb  
- **15.** neck  
- **16.** stomach  
- **17.** chin  
- **18.** chest  
- **19.** back  
- **20.** heel  
- **21.** elbow  
- **22.** fingernails  
- **23.** ankle  
- **24.** waist  
- **25.** hip

**Developmental Age:**

**Notes:**

### G-2  152-3

**Colors:**

- Match: **red** blue green yellow + orange purple brown black pink grey white

**Developmental Age:**

**Notes:**

### G-2a:1

**Points to when requested:**

- **red** blue green yellow + orange purple brown black pink grey white

**Developmental Age:**

**Notes:**

### G-2a:2

**Names when pointed to:**

- **red** blue green yellow + orange purple brown black pink grey white

**Developmental Age:**

**Notes:**

### G-2a:3

**Design Concepts:**

- **circle** square + rectangle triangle diamond

**Developmental Age:**

**Notes:**

### G-2a:4

**Points to when examiner names:**

- **circle** square rectangle triangle diamond

**Developmental Age:**

**Notes:**

### G-2a:5

**Names when examiner points to:**

- **circle** square rectangle triangle diamond

**Developmental Age:**

**Notes:**

### G-4  156-7

**Time Concepts:**

- **1.** today  
- **2.** yesterday  
- **3.** last night  
- **4.** tomorrow  
- **5.** 8 day after tomorrow  
- **6.** morning  
- **7.** 9 day before yesterday  
- **8.** afternoon  
- **9.** tonight  
- **10.** last week  
- **11.** 12 next week  
- **12.** next year

**Developmental Age:**

**Notes:**
APPENDIX E
PLEASE NOTE:

Copyrighted materials in this document have not been filmed at the request of the author. They are available for consultation, however, in the author's university library.

These consist of pages:

136-140
APPENDIX F
I, _______________________, grant permission to the
(Parent's name)
faculty, staff and students of the University of Nevada, Las Vegas, to
provide educational programs, gather data and do research projects in a
supervised setting with my preschool child. I knowingly and voluntarily
place my child in the ____________________________
program and release The University of Nevada, Las Vegas, its faculty, staff
and students from any and all liability resulting from my child
participating in this program.

________________________________________
Signature

________________________________________
Signature

________________________________________
Date
VITAE
VITAE

CONNIE ROSE LAMBERT, M.S.

CURRENT STATUS: Supervisor/Master Teacher for the Early Childhood Education for the Handicapped Program, University of Nevada, Las Vegas

PERSONAL DATA:

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Office Address: College of Education University of Nevada, Las Vegas 4505 Maryland Parkway Las Vegas, NV 89154

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EDUCATION:

M.S. in Early Childhood Education for the Handicapped University of Nevada, Las Vegas Las Vegas, NV 1986-88

B.S. in Behavioral Sciences University of Southern Colorado Pueblo, CO 1979-81

Bachelor's degree in Behavioral Sciences with emphasis on clinical counseling. Practicum for two semesters at Pike's Peak Mental Health Clinic, Fountain Valley, Colorado. Taught behavior modification oriented parenting classes and the Systematic Training for Effective Parenting.

Master's Degree in Early Childhood Education for the Handicapped. Completed two semesters and two summer sessions of personnel preparation in a classroom with young handicapped children ages birth to eight years. Emphasis on classroom organization, preparation of lesson plans, large and small group as well as individual activities, grouping and regrouping, conducting assessments, writing Individualized Education Plans, daily charting and anecdotal recording, organizing parenting meetings, preparing Individualized Family Service Plans, writing monthly newsletters, and coordinating with community agencies.
Honors

Graduate Assistant  University of Nevada, Las Vegas 1986–88

Academic Scholarship  Graduate Student Association 1987

B.S. with Special Distinction