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ACADEMIC ACHIEVEMENT AMONG LANGUAGE-IMPAIRED
CHILDREN AS A FUNCTION OF INTENSIVE
PRESCHOOL LANGUAGE INTERVENTION

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Parents and professionals are concerned about the long-term effects of language problems on later academic, communicative and behavioral functioning of children. The purpose of this study was to examine the relationship of level of language impairment with type of class placement, reading achievement, and social emotional functioning. Subjects were 19 children, aged 4 years, 10 months through 10 years, 4 months, who had previously been enrolled in a preschool language development program. Statistical analyses were performed on data from the Kaufman Assessment Battery for Children (K-ABC), Test of Early Reading Ability (TERA), and the Achenbach Child Behavior Checklist (CBC). Results do not support a relationship between level of language impairment and academic or social/emotional functioning.

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ACADEMIC ACHIEVEMENT AMONG LANGUAGE-IMPAIRED
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PRESCHOOL LANGUAGE INTERVENTION

Disorders of speech and language development are increasingly recognized as a major problem among young children. The causes of speech and language disorders are varied and, in many cases unknown. These disorders are known to antedate serious psychosocial problems, as well as academic failure. Despite the increasing focus on this area, there are no reliable data on the prevalence of speech and language disorders among school children (Beitchman, Nair, Clegg, & Patel, 1986).

Parents and professionals are frequently concerned about the long-term effects of speech and/or language problems on social, academic, behavioral, and communicative performance of children. Negative social and academic effects present serious considerations for these children. Many times learning disabilities result from, or combine with speech and language problems and produce a need for supplemental educational services. Parents and professionals ask if any negative effects can be lessened or avoided by speech-language services (King, Jones, & Lasky, 1982). Answers to these questions will be valuable in counseling parents, providing prognostic guidance, and planning programs for these children.

There has been limited information obtained from longitudinal studies or follow-up surveys of children diagnosed as having speech-language disorders during their preschool years. The reported studies have indicated that many elementary aged children, initially diagnosed as speech-language impaired, continue to evidence, in the elementary school years, residual speech and/or language deficits and lowered levels of academic achievement, primarily in reading/writing related areas and, to some extent, in math (King et al., 1982).

Nelson and his colleagues (1987) have stated that the language-impaired child's linguistic and cognitive difficulties may be caused by less capacity and efficiency in processing verbal and nonverbal information. This difficulty may be a factor in the area of encoding as opposed to storing and retrieval of information, whether because of perceptual, attentional, and/or representational abilities. It has yet to be determined what long-term effects early intervention with these language-impaired children might yield on subsequent academic and social performance.

The majority of studies addressing impact of intervention on groups of language-impaired children have been retrospective and few have been based upon systematic measures obtained at the outset. Methodological weaknesses

limit the conclusions and generalizations which can be drawn (Aram, Ekelman, & Nation, 1984). Collectively, these studies suggest that young children with language disorders are at risk for a range of later academic and social problems.

Focus

If the relationship between intensive preschool intervention for early language deficits and attainment of later academic achievement can be confirmed, educators and therapists will have a clearer idea of what areas of strength and weakness to anticipate in dealing with these children. This information will present valuable direction for formulation of realistic educational goals and objectives and will offer direct implications for educational programming. Additionally, effects of language impairment which interfere with social, behavioral, and communicative functioning may be more adequately addressed as well.

Children with language impairment have presented parents and educators with a number of questions concerning long-term effects of language difficulties upon academic and social functioning. The purpose of this study was to examine the relationship of language impairment with type of class placement, academic achievement in the area of reading, and present social/emotional functioning of the child.

Review of the Literature

Theoretical Description of Language Acquisition

As the child moves through the stages of normal language development, he or she faces tasks associated with phonology (the articulatory and acoustic features of speech sounds), morphology (the construction of meaningful units of speech), syntax (rules identifying sequential relationships of verbal units), and semantics (the definition or interpretation of each unit of speech). Several major developmental milestones in the normal course of the child's acquisition of language have been identified. At one to two months of age, the infant makes cooing sounds in addition to crying. From three to six months, babies babble and coo, and first words are usually spoken between nine and 14 months of age. Between 18 and 24 months, first sentences appear, and by three to four years of age, children are able to use all basic syntactic structures of language. During the period between four and eight years of age, they acquire the capability of producing correct articulation of all speech sounds in context (Menyuk, 1972).

A continuum of language acquisition theories presently exist. These theories range from the viewpoint of behavioral psychologists, who emphasize the role of the environment and shaping of the child's linguistic behavior by others to those who stress the innate and physiological

determinants of speech. The physiologically oriented theorists believe that the physical development of the child's brain, as opposed to the quality of experience with language, may be the major determinant of many aspects of language development. Such aspects include the age at which a child begins to babble, to combine words, and to master complex sentence formulations (de Villiers & de Villiers, 1978).

Piaget (1967, 1970) believed that the onset of language is contingent upon the acquisition of certain cognitive prerequisites which are the outcomes of the sensorimotor period of development. Two examples of this theory include the concepts of object permanence, that an object stays the same over changes in position or orientation, and symbolic representation, in which the child makes one object stand for another. It would be difficult for a child who had not developed these schemas to use an arbitrary sequence of phonemes, a word, to stand for a concrete object (de Villiers & de Villiers, 1978).

Vygotsky (1978) argues that higher levels of cognition originate in language. He has proposed that certain concepts cannot be developed until language has developed the capacity to deal with these concepts. Further, Vygotsky stated that after the age of two, emotions, perceptions, and social behavior are intimately related

with linguistic experience. It is the capacity for language which enables children to use the planning function to solve difficult tasks, overcome impulsive action, plan a solution to a problem prior to its execution, and master their own behavior.

Children demonstrate substantial, individual variation in their language development (de Villiers & de Villiers, 1978). There are several ways in which language can be delayed or deviant: onset of intelligible speech may be late; the rate of development after onset may be abnormally slow; or the final level of competence achieved may remain below that of normal adults. All three types of delay could occur in the same child and often do, as in the severely retarded. The question of delay or true deviance in the form and process of language acquisition has guided many descriptive studies of the developmentally disabled child.

The language-impaired child has been described by Dworkin (1985) as a child who falls within the average range of intelligence, but whose performance is one standard deviation or more below the mean in expressive/receptive language functioning. Difficulties in language development are generally identified in the areas of expressive language, receptive language, or articulation.

Receptive language impairment is characterized by difficulties in comprehending single words, following single and multiple directions, understanding inflectional endings and other affixes, understanding word order, understanding questions, and comprehending connected discourse. Persistent and frequent echolalia beyond the age of four may also be present (Dworkin, 1985).

Expressive language impairment is characterized by difficulty in using appropriate words, in sequencing of words in sentences or questions, and in producing connected discourse. There may also be frequent omission or substitution of inflectional morphemes (i.e., "ing," "ed," or "s") (Dworkin, 1985).

Articulation impairment includes certain types of mispronunciations which persist beyond the age of three. Additionally, there may be errors in pronunciation which do not seem to follow predicted developmental patterns (Dworkin, 1985).

Follow-up Studies

Procedures for structuring observations of the child's actual language production can be divided into standardized tests of language and spontaneous language samples. The goal of assessment helps to determine the choice of assessment instruments. If the major purpose is to identify the child as either language-disordered or normal,

then a standardized test would determine if the child's syntactic and semantic production and comprehension were similar to those of his peers. If the major purpose were to provide a comprehensive description of the child's language abilities and deficits, then a variety of nonstandardized procedures would provide the necessary information (Hall & Tomlin, 1978).

Many of the early studies of language-impaired children have investigated a given aspect of their speech production or comprehension at one specific time, often employing a standardized test. The performance of the child with a particular disorder has then been compared to the performance of normal subjects on the same test. Very few studies have compared several aspects of the linguistic functioning of one child and related them to other aspects of the child's cognitive and social functioning (de Villiers & de Villiers, 1978).

Most of the relevant studies of language-impaired children which have been performed since 1976 might be described as general group follow-up studies. In these follow-up studies, which are summarized below, children who had been diagnosed as language disordered were evaluated at a second point in time across various skills such as communication competence, academic achievement, and personal-social functioning.

Aram, Ekelman, and Nation (1984) assessed language, intelligence, academic achievement, and behavioral adjustment in a group of 20 adolescents originally studied ten years earlier as preschoolers. Follow-up results indicated that 20% had WISC-R IQ scores falling within the mentally deficient range and were being educated in special education class placements. Of the remaining students, 69% had required special tutoring, grade retention, or placement in a class for the learning disabled. The majority of nonmentally retarded subjects continued to evidence persistent deficits in language and academic achievement and were rated by their parents as less socially competent and having more behavioral problems than their peers.

Aram and Nation (1980) evaluated 63 language-disordered children four to five years after their initial diagnosis. At follow-up, approximately 40 children continued to present speech/language problems, and approximately 40 children presented other learning problems. Results of this study indicated that preschool levels of language comprehension, formulation, semantic, syntax, phonology, and speech production were moderately correlated to subsequent class placement in elementary grades. Additionally, the duration of therapy following preschool was related to the severity of phonologic deficit

as rated during the preschool years and was also related to follow-up ratings for speech, language, and academic abilities.

In a study of 192 normally hearing children who were experiencing speech/language delays, Beagley and Wrenn (1970) concluded that, at follow-up, the majority of the children had improved considerably. They found that spontaneous improvement was more evident in the average and highly intelligent group in contrast to the group of children demonstrating intelligence falling within the lower range. A small group of 16% showed no improvement and 4%, consisting of children with subnormal intelligence, demonstrated regression of speech/language abilities.

A retrospective follow-up interview of 44 language-delayed children was performed by Garvey and Gordon (1973). The main purpose of the interview was to consider school placement relative to intelligence, reading and writing difficulties, behavioral difficulties, and present level of speech/language development. Although approximately 50% of the subjects were receiving education in regular education school placements, the remaining subjects were found in special school placements. Results of this survey indicated persistent difficulties in all areas measured.

A follow-up survey of 49 students who received concentrated speech therapy and remedial education from the

John Horniman School in Worthing, England was performed by Griffiths (1969). These data were gathered to investigate speech/language development, educational attainments, and social/emotional functioning. About 70% of the students had reached a level of speech/language development considered to be within normal limits. It was concluded that children whose articulatory difficulties were associated with mild motor disorders appeared to produce better results than those with associated language difficulty. At the time of the survey, 19 of the subjects were in regular educational placements, with only five making satisfactory academic progress. Results of this survey suggested that most of the children had achieved a satisfactory level of social development and that, although there was maladjustment demonstrated in some subjects, these difficulties were not directly associated with linguistic handicap.

Hall and Tomlin (1978) conducted a follow-up study of 18 language-impaired and 18 articulation-impaired children after a period of 13 to 20 years following their initial contact with the University of Iowa Speech and Hearing Clinic. Information was gathered from parent's reports and records of standardized testing conducted while the subjects were in elementary and secondary schools. Results indicated that the language-impaired group consistently

achieved at a lower level than the articulation-impaired group. This difference was most evident in the area of reading. Differences between the groups were also exhibited in the types of post-secondary education attempted by the subjects.

A 15-year follow-up of 50 subjects initially diagnosed during childhood as communicatively impaired, was performed by King, Jones, and Lasky (1982). Clinic records from the Kent State University Speech and Hearing Clinic were obtained and telephone interviews were conducted to ascertain data on aspects of educational functioning. This information included delay of school admission, academic areas of difficulty, tutoring needed and provided, grade level at time of follow-up survey, and grades received. Fifty-two percent of the subjects were reported to have had difficulty in one or more academic areas, including reading, math, and/or English. Tutoring was provided for 28 of the subjects. School placements varied depending on the needs of the students and the particular school system within which the student was enrolled. Problems in social and interpersonal relationships were reported by families for only 8% of the subjects. This proportion is not in excess of that seen within the general population and indicates that these results do not support those of

Griffiths (1969) regarding poor social and emotional development of communicatively impaired adolescents.

Stark, Catts, Bernstein, and Condino (1982) conducted a follow-up investigation of 29 language impaired children and 14 normal children three and one-half to four years following the initial assessment. At time of follow-up, both groups were given standardized tests of intelligence, speech and language, and reading. Results suggest that 25% of the language-impaired group made sufficient progress in language abilities to warrant reclassification of their language abilities as normal, although a significant gap remained between nonverbal and verbal abilities as measured by the Weschler Intelligence Scale for Children - Revised (WISC-R) Performance IQ. Ninety percent of the language impaired children showed some degree of reading disability at the time of follow-up.

A follow-up study of 38 children, who had attended a preschool language unit in England, was undertaken by Urwin, Cook, and Kelly (1988). Subjects were assessed utilizing standardized tests and rating scales completed by parents and teachers. Results indicated that children were still making progress in all areas of development. Eighty-four percent of the subjects were within the mainstream of education with 16% attending special schools or classes.

Continuing language difficulty was apparent on standardized tests, with reading and spelling slightly depressed.

A variant of the group follow-up studies is one in which the subjects are evaluated in the later examination in only one area of particular interest. Such studies include those carried out by Weiner (1972), Nippold and Fey (1983), and Nelson, Kamhi, and Apel (1987).

As part of a longitudinal investigation of the language and language-related behavior of dysphasic children, Weiner (1972) retested seven experimental and seven normal control subjects. The battery of tests assessed auditory-perceptual, auditory-vocal, and oral-motor functioning as well as language comprehension. Weiner reported results to be consistent with findings of the first assessment. Dysphasic children continued to be deficient in auditory-vocal and oral-motor functioning and in language comprehension. Dysphasic and normal control subjects were found to be equivalent in visual-perceptual and visual-motor functioning.

Nippold and Fey (1983) investigated metaphoric understanding and its relationship to a cognitive task of reasoning in preadolescent children whose mean age was ten years, seven months. The children performed as well as a comparison group of normal preadolescents on certain tests assessing abilities involving literal aspects of language

and on a nonverbal intelligence test. In their understanding of metaphoric sentences and performance of reasoning task, however, the children demonstrated deficiencies in understanding.

The hypothesis-testing abilities of 15 language-impaired and 15 normally developing children, who were matched for mental age, were investigated. Children were presented with two types of discrimination-learning tasks featuring explicit and nonexplicit input concerning correct response choice. The results revealed significant differences in the performance of the language-impaired and normally developing children. Findings suggested that the language-impaired children exhibited deficits in solving discrimination-learning problems which might be related to their ability to encode information (Nelson, Kamhi, & Apel, 1987).

Predictive Studies

Still another form of investigation represented in the literature is the predictive study (Bishop & Edmundson, 1987; Schery, 1985). The results of the initial evaluation are used to attempt to predict outcome at the time of the later evaluation. This form of study differs from the preceding ones essentially in the focus on prediction of the child's future functioning, rather

than on measuring, at a later time, the degree and nature of change in language abilities.

In a longitudinal study, Bishop and Edmundson (1987) examined 87 language-impaired children at the ages of four, four and one-half, and five and one-half years of age. In 37% of the children, the language disorder had resolved by the age of five and one-half years so that they were indistinguishable from a control group. Findings indicated that good or poor outcome for individual children could be predicted with 90% accuracy on the basis of test measures obtained at four years.

Schery (1985) organized a large data archive gathered over an eight-year period on 718 subjects in the Los Angeles County Schools day program for children with severe language disorders. Descriptive data from program records was categorized by demographic/background, physical/development, social/personality, and language/academic characteristics. This body of data was analyzed to provide a broad description of this group of children. The primary research variables failed to account for language performance at program entry or relative language gain over time. In prediction of language functioning, a history of physical/neurological problems at birth was related to an initially lower level of language functioning. Social-emotional and personality characteristics of the children

were related to faster progress in language over a two to three year period.

Case Studies

There have been several case studies that have presented various aspects of a single subject's functioning over a period of time (Kerschensteiner & Huber, 1975; Weiner, 1974). Weiner (1974) re-examined a 16-year-old language-delayed boy who had been initially tested at four years of age. Measures of the subject's speech and language, intelligence, reading achievement, and personal-social adjustment provided evidence of continuing deficits in the major language-related areas. These areas include speech and language, verbal intelligence and reading. Weiner reported that these deficits appeared to have adverse effects on the subject's communication, educational achievement, and social adjustment.

Methodological Problems in Research

Weiner (1985) reported that the majority of studies of language-impaired children and adolescents have been faced with universal problems. He stated that almost all of these studies are retrospective where subjects are sought who had been diagnosed some years earlier as language disordered and information about current functioning is gathered, often by parent interview. Limitations of this approach to research include: the investigator's lack of control over design,

small sample size resulting from difficulty tracing candidates, and limit to one clinical or study center. Further, there is often a broad range of hearing abilities and mental abilities, and no control over information available from the initial evaluation. Measures which were originally used to describe speech and language functioning of the subjects in the earlier period, may not have much meaning in the current context, and data on other more relevant aspects of functioning may be missing.

It is often impossible to determine representativeness of the sample to the general language-disordered population because of the small number of subjects in each sample and limited initial information on each subject (Weiner, 1985). Surveying journals in communication disorders, special education, and psychology, Wickstrom, Goldstein, and Johnson (1985) concluded that the only standard items among subject descriptors are age, sex, and diagnosis. Further, they stated that research on treatment of language-impaired children seldom employs random sampling of large populations to select representative groups of subjects. Such random sampling is not usually feasible and sometimes not desirable, because with heterogeneous populations of language-handicapped children, an average result may obscure a highly successful intervention.

Summary

Despite methodological problems, findings have been rather consistent. In group follow-up studies, a large number of language disordered children in the sample were found on re-evaluation to have remaining communication problems (Aram, Ekelman, & Nation, 1984; Aram & Nation, 1980; Badian, 1988; Childs & Angst, 1984; Nippold & Fey, 1983; Urwin, Cook, & Kelly, 1988; Weiner, 1972, 1974). In many of the studies, a majority of the subjects continued to experience difficulties whether the interval between the original and follow-up evaluations was relatively brief or as long as 15 years. In each of the studies that explored academic progress, it was found that problems existed (Aram, Ekelman, & Nation, 1984; Aram & Nation, 1980; Garvey & Gordon, 1973; Griffiths, 1969; Hall & Tomlin, 1978; King, Jones, & Lasky, 1982; Stark, Catts, Bernstein, & Condino, 1982; Urwin, Cook, & Kelly, 1988; Weiner, 1974). Only a few of the studies explored the existence of social and personal adjustment problems (Griffiths, 1969; King, Jones, & Lasky, 1982; Weiner, 1974). Resulting data do suggest difficulties in this area as well.

Statement of the Problem

Many children diagnosed with delays in language development continue to evidence problems in the areas of academic performance and social development. The purpose of

this study was to assess the possible relationships which might exist between the severity of language impairment and academic, social, behavioral, and communicative performance in later years. To carry out the purpose of this study, the following hypotheses were tested.

Hypotheses

1. Children with moderate language impairment would more often receive special academic assistance (special class placement or additional language therapy) than children with mild language impairment.

2. Children with moderate language impairment would demonstrate reading achievement defects relative to children with mild language impairment.

3. Children with moderate language impairment would evidence greater difficulty in auditory perception/ memory, as measured by the Sequential Scale of the Kaufman Assessment Battery for Children, than children with mild language impairment.

4. Children with moderate language impairment would demonstrate a higher incidence of social/emotional problems than children with mild language impairment.

METHOD

Overview

The Preschool Language Development Program (PLDP), which is offered by the clinical division of Callier Center

for Communication Disorders, is an intensive language treatment program. PLDP serves those children two and one-half to five years of age who are experiencing a delay in language development but have normal development in all other areas. Contact is maintained with approximately forty children who have participated in the program for periods of six months up to two and one-half years. Previous summer follow-up studies have engaged about 20 subjects consisting of approximately two-thirds boys and one-third girls.

Subjects

To obtain subjects for this study, the investigator contacted parents of the 40 children who have participated in the PLDP follow-up study in past years. Initial contact was made by telephone and the investigator explained the nature and purpose of the study. At that time, parents who wished to have their children participate in the present study were scheduled for an interview and their children were scheduled for individual administration of assessment procedures.

Children with mental retardation, moderate to severe hearing loss, or visual impairment were not included. Four subjects who scored under 85 on the Simultaneous Processing Scale of the Kaufman Assessment Battery for Children (K-ABC), described below, were excluded from this study.

For the purposes of this study, subjects were dichotomized as having mild or moderate language impairment according to their performance on the Test of Language Development-Primary (TOLD-P) or Test of Language Development-Intermediate (TOLD-I). Subjects obtaining scores of 85 or above were classified as mildly language impaired. Subjects scoring below 85 were classified in the moderate range of language impairment. The TOLD-P and TOLD-I are standardized measures of expressive and receptive language functioning and are described below.

The subjects were 19 children, 13 males and 6 females. There were 2 Hispanic, 1 Black, and 16 Anglo subjects who ranged in age from 4 years, 10 months to 10 years, 4 months. Additionally, 3 males and 1 female completed assessment procedures but were excluded from the study because they achieved scores falling in the mentally retarded range of intellectual abilities.

Materials

Kaufman Assessment Battery for Children (K-ABC). The K-ABC (Kaufman & Kaufman, 1983) assesses intelligence in terms of mental processing with four Global Scales: Simultaneous Processing, Sequential Processing, Mental Processing Composite, and Achievement. The K-ABC yields a Mental Processing Composite which is interpreted as an index of overall intellectual functioning. The Mental

Processing Composite has a mean value of 100 and a standard deviation of 15. Scores in the range of 85 to 115 lie in the Average range and place the child's intellectual functioning in the middle two-thirds of all same-aged children.

The K-ABC is made up of 16 subtests, although a maximum of 13 is administered to any particular child. Most of the subtests are untimed and total administration takes from 35 to 85 minutes. The K-ABC assesses such abilities as expressive vocabulary, visual and auditory memory, visual closure, sequencing, and visual-spatial relations.

Each task in the K-ABC Sequential Processing Scale presents a problem which must be solved by arranging the input in sequential or serial order. The subtests comprising this scale assess short term visual and auditory perceptual and memory abilities.

The Simultaneous Processing Scale presents tasks which are spatial, abstract, or organizational in nature. Simultaneous problem-solving is accomplished by processing many stimuli in an integrative fashion rather than stimulus-by-stimulus as is characteristic of sequential problem-solving.

The K-ABC demands minimal verbal language requirements, includes various exceptional groups in the

standardization sample, and contains tasks which reduce racial differences (Zucker & Copeland, 1988). Test-retest and odd-even reliability are reported in the .80s and .90s for the global scales. Additional reliability/validity information has been published in the Administration and Scoring Manual (Kaufman & Kaufman, 1983).

The Tests of Language Development-Primary (TOLD-P) and Intermediate (TOLD-I). The TOLD-P (Hammill & Newcomer, 1977) and TOLD-I (Hammill & Newcomer, 1982) present a battery of subtests measuring both the expressive and receptive dimensions of developmental phonology, syntax, and semantics. The TOLD-P was designed for children aged four years to eight years, eleven months of age. The TOLD-I was designed for children 8 years, 6 months to 12 years, 11 months of age. The TOLD-P and TOLD-I are scored in terms of a Spoken Language Quotient (SLQ) with a mean of 100 and a standard deviation of 15. The SLQ provides a general index of the subject's overall language abilities and is based on five subtests which assess syntax, semantics, speaking, listening, and overall spoken language. The manual provides a thorough description of methodology utilized to evaluate reliability and validity. Test-retest reliability and internal consistency coefficients are reported in the .80s and .90s.

Test of Early Reading Ability (TERA). This instrument was designed to assess early reading ability. The TERA assesses the child's ability to construct meaning from print, demonstrate knowledge of the alphabet and its functions, and evidence knowledge of the conventions of written language. The TERA offers a Reading Quotient (RQ) with a mean of 100 and standard deviation of 15. The manual reports test-retest and stability reliability coefficients in the .80s and .90s.

Achenbach Child Behavior Checklist (CBC). The CBC (Achenbach, 1982) is a parent report of the emotional and behavioral functioning of children from ages two to sixteen years of age. The CBC consists of 118 items which are scored on a three point scale ranging from not true to often true. Specific dimensions assessed include Schizoid/Anxious, Depressed, Uncommunicative, Obsessive-Compulsive, Somatic Complaints, Social Withdrawal, Hyperactive, Aggressive, and Delinquent. The scored questionnaire yields a T score for each dimension and provides a profile of the emotional/behavioral functioning of the child. Individuals with T scores greater than 70 on any dimension are considered to be at risk for emotional/behavioral difficulties in that area of functioning. The psychometric properties of the CBC have been extensively evaluated and are discussed in the manual. Coefficients on assessments

of test-retest reliability, inter-parent agreement, and inter-interviewer reliability were above .90.

Procedure

Children were scheduled individually during the summer for individual formal assessment. Parents were presented an introductory letter and consent form for completion before assessment was initiated (see Appendix A). Assessment instruments used to determine level of intellectual functioning and academic achievement were administered by a master's level psychology intern. Language and language-related reading assessment were conducted by a master's level speech pathologist. Mothers completed the Achenbach Child Behavior Checklist (CBC). Additionally, mothers were interviewed to ascertain medical, family, and school history (see Appendix B).

Measurement

For purposes of this study, the major variables were operationally defined as follows:

- (1) Expressive/Receptive language functioning--Major components of speaking and listening abilities as assessed by the Tests of Language Development-Primary and Intermediate and reported as a Spoken Language Quotient (SLQ).
- (2) Class placement--Three levels of class placement were defined as regular class, regular class with speech therapy, or special class.

(3) Academic performance--Reading achievement as measured by the Test of Early Reading (TERA) and reported as a Reading Quotient (RQ).

(4) Intellectual functioning--Overall cognitive functioning as measured by the Sequential and Simultaneous Processing Scales of the Kaufman Assessment Battery for Children (K-ABC). Reported as the Mental Processing Composite (MPC).

(4) Social/Emotional functioning--Profile of behavioral indicators (i.e., depressed, withdrawn, aggressive, destructive, somatic problems) as depicted by parent report on the Achenbach Child Behavior Checklist and reported in T score form.

Data Analysis Procedures

The sources of information used to answer the statistical questions and research hypotheses were test data from the K-ABC, TOLD-P, TOLD-I, TERA, and the Achenbach CBC. Information concerning class placement and additional speech services information for each student was obtained through parent interview.

Chi square analysis was performed to test the hypothesis that the child's classification according to level of speech/language impairment is related to type of class placement. Data for this analysis included level of language impairment and type of class placement.

The small number of available subjects necessitated utilization of a nonparametric technique of data analysis, the Mann-Whitney U test for two independent samples. This procedure was performed on Reading Quotient (RC) scores from the TERA to test the second hypothesis which stated that level of language impairment is related to school achievement as indicated by reading ability.

Data from the K-ABC Simultaneous and Sequential Processing Scale was analyzed to determine if children experiencing moderate/severe language delay more often demonstrate difficulties in auditory perception/memory abilities than children with mild language impairment. To test this hypothesis, the dependent measure was the number of significant differences between each individual's Simultaneous and Sequential Processing Scale scores. The difference needed to obtain significance was determined according to criteria specified in the Administration and Scoring Manual of the K-ABC (Kaufman, 1983).

Chi-square analysis was performed on data from the Achenbach CBC to test the fourth hypothesis, that level of language impairment was related to emotional functioning. Data for this analysis included the number of children achieving significant elevations on the dimensions of the CBC and level of language impairment.

RESULTS

For each hypothesis, specific procedures of statistical analysis were used. The first hypothesis stated that children experiencing moderate level of language impairment would more often be found in special class placement or in regular class with additional speech and language therapy than children with mild language impairment. Chi square analysis revealed no relationship between level of language impairment and type of class placement. Results of the chi square analysis are summarized in Table 1.

Table 1

Chi Square Analysis for Class Placement and Level of Language Impairment

Experimental Condition	Mild	Moderate	Total
Regular class	5	1	6
Regular class with speech therapy	4	4	8
Special Class	2	3	5
Total	11	8	19

$$X^2 = 2.45; p = .293$$

The second hypothesis stated that children experiencing moderate levels of language impairment would demonstrate academic difficulties in the area of reading more often than children with mild language impairment. The Mann Whitney U test performed on TERA Reading Quotient (RQ) scores revealed no significant differences between groups, as observed in Table 2. However, results approached statistical significance in the direction predicted.

Table 2

Mann Witney Confidence Interval and Test on Language Quotient Scores of Early Reading Ability (TERA) for Mild Versus Moderate Levels of Language Impairment

Measure	Mild (<u>n</u> = 11) <u>M</u>	Moderate (<u>n</u> = 7) <u>M</u>	<u>p</u>
TERA	86.3	75.3	.084

The next hypothesis, that children experiencing moderate levels of language impairment would more often evidence difficulties in auditory perception/memory

abilities, was not confirmed. Results of chi square analysis are summarized in Table 3.

Table 3

Chi Square Analysis for Significant Differences in K-ABC Sequential and Simultaneous Processing Scale Scores and Level of Language Impairment

Experimental Condition	Outcome of Study		
	Mild	Moderate	Total
Significant Difference	7	2	9
Nonsignificant Difference	5	5	10
Total	12	7	19

$$\chi^2 = 1.57; p = .210$$

The fourth hypothesis stated that children experiencing moderate levels of language impairment would more often demonstrate social/emotional difficulties. Results of chi square analysis, as summarized in Table 4, revealed no differences in the number of significant elevations based upon group membership.

Table 4

Chi Square Analysis for Significant Difference in Number of Elevations on Achenbach CBC and Level of Language Impairment

Experimental Condition	Mild	Outcome of Study Moderate	Total
Significant Elevations	5	4	9
Nonsignificant Elevations	6	4	10
Total	11	8	19

$$X^2 = .038; p = .845$$

DISCUSSION

The purpose of this study was to determine if relationships could be suggested between level of language impairment and functioning in areas related to academic achievement and social/emotional functioning. All results were insignificant. The nature of this design introduced a number of threats to internal validity which limit the generalizability of results beyond the boundaries of this particular group of language-impaired children.

The first hypothesis tested the relationship between individual's classification according to level of speech/language impairment and type of class placement. Results were nonsignificant. With such a small number of subjects, it would take a large difference to reach the level of

significance. Difficulty in categorizing class placements, described below, may have further confounded analysis of the relationship hypothesized.

The second hypothesis, that children with more severe language impairment will demonstrate reading achievement deficits, was not supported. The small number of subjects, requiring a large difference for significance, and lack of distinction between those children experiencing expressive versus receptive delays prevented a true investigation of the relationship between language delay and reading ability.

The next hypothesis stated that children with moderate language impairment would evidence greater difficulty in auditory perception/memory abilities than children with mild impairment. Chi square analysis did not support this hypothesis. The relationship between auditory pathway anomalies and type of language impairment (expressive or expressive/receptive) has been suggested (Tallal, Stark, & Mellits, 1985). Children in this study were not dichotomized by expressive or expressive/receptive delays. Therefore, the heterogeneous nature of this group is likely to have prevented the determination of a relationship between sensory/memory abilities and language dysfunction. Further, only two of the subjects in the moderately impaired group demonstrated a significant split in their Sequential and Simultaneous Scale scores.

It may be that these children were more globally delayed than the mildly language-impaired children.

The final hypothesis, that children with moderate language impairment would demonstrate a higher incidence of social/emotional problems than children with mild language impairment, was not supported. With such a small number of subjects, a large difference is required to achieve significance.

The subjects in this study represented a heterogeneous group of children experiencing both expressive and expressive/receptive language delay. The inclusion of both categories of children into one all-encompassing category of "language-impaired" minimizes the effectiveness of efforts to determine the specific strengths and weaknesses of this population. Also, increasing the heterogeneity of this group are ethnic/cultural differences and socioeconomic diversity. These factors are directly related to differential opportunities for enrichment of language development.

Subjects in this study entered the preschool program at different ages and remained enrolled for differing periods of time. Age at entry and exit varied and time since the student exited the program varied greatly as well. There is too small a number of subjects at any given age to constitute a group of age-mates for purposes

of comparison. Bishop and Edmundson (1987) have stated that the wide range of ages usually included in this type of study introduces significant variance which is likely to be large enough to mask the effects of interest.

Small sample size caused by attrition in a longitudinal study is a major difficulty because many subjects have moved from the area. Additionally, some students improve greatly over time and parents may lose interest in participating in such a time consuming assessment procedure on a yearly basis. Some students have continued to evidence difficulties in language-related areas. It is possible that parents of these children find it discouraging to receive negative results repeatedly from follow-up assessment.

Because the PLDP follow-up program has gone on for so many years, there are many difficulties in the selection of subjects. Criteria for admittance into the language development program were evolved over a period of several years. During that time, as criteria for selection changed, students were increasingly chosen on the basis of demonstrated commonalties in the areas of language and cognitive abilities as well as behavioral functioning. The pool of possible subjects, therefore, can in no way be considered representative of the language-impaired within the population.

Diagnostic criteria for PLDP have changed over time and there are few comparable measures available for all subjects. A related difficulty is the fact that some of the children were virtually untestable in the area of verbal skills upon entering this program. The only measures available from their initial entrance assessment are nonverbal measures of cognitive abilities.

Additional difficulties in this study include the definition of mild and moderate language impairment. Language-impaired children demonstrate uneven abilities in expressive and receptive language skills. Therefore, global classification on the basis of a composite of their language abilities does not offer precise definition. Further, the cut-off scores utilized to designate levels of language impairment are arbitrary and it is possible that an insignificant split into each category actually existed in this small group of subjects.

Definition of class placement was complicated by several factors. Some of the more severely language-impaired children were reported to be enrolled in regular classrooms, with no additional speech services, while several of the mildly impaired children were placed in special classrooms within private school settings. The differential placement appeared to result more from family socioeconomic considerations, size of the school district

attended, and availability of speech and language program than from a true "fit" of degree of impairment with intensity of intervention.

Major limitations of this type of study have been summarized by Weiner (1985). Weiner suggests that the investigator's lack of control over the design and small sample size present serious difficulties. These factors lead to an inability to determine representativeness of the sample of the general language disordered population. It is possible that significant differences in these groups could have been determined with larger groups and greater effort to control the threats to internal validity. The use of at least one control group is recommended with subjects coming from more than one clinical facility. This would assist in attaining larger numbers of subjects and providing subjects with a wide variety of backgrounds, both socioeconomic and ethnic.

APPENDIX A
INTRODUCTORY LETTER TO PARENTS
AND CONSENT FORM



CLINICAL DIVISION

THE UNIVERSITY OF TEXAS AT DALLAS
Callier Center for Communication Disorders

1988 INWOOD ROAD DALLAS, TEXAS 75226 (214) 802-3000

Dear Parents,

I will be conducting a research project designed to study the long-term effects of early language intervention programs upon school learning. The study consists of one three hour session for each child. During the session, assessment of intellectual functioning and academic achievement will be performed utilizing commonly accepted and widely used assessment techniques (Kaufman Assessment Battery for Children and Woodcock-Johnson Tests of Achievement). Additionally, the parent will be interviewed briefly and requested to complete the Achenback Child Behavior Checklist and the Vineland Adaptive Behavior Scales (Classroom Version).

To preserve confidentiality, children will be referred to by number for identification purposes. If at any time your child expresses a desire to discontinue assessment procedures, he/she will be escorted back to you in the waiting area and all testing will be terminated. Your decision whether or not to allow your child to participate in this study, or your child's decision to discontinue testing, in no way affects your child's participation in the PLDP Follow-Up Study. At the conclusion of this study, parents will be mailed a brief summary report of their child's assessment results. A summary of the project, at its completion, will be made available to interested parents upon request. Should you have any questions or desire further information, please call me (214-943-7501). Thank you in advance for your cooperation and support.

Sincerely,

Sarah McCormack, M.Ed.
Psychology Intern

James E. Stahlecker, Ph.D.
Head, Psychological Services

THIS PROJECT HAS BEEN REVIEWED BY THE UNIVERSITY OF TEXAS AT DALLAS OFFICE OF SPONSORED PROJECTS (PHONE: 690-2313) AND THE UNIVERSITY OF NORTH TEXAS COMMITTEE FOR THE PROTECTION OF HUMAN SUBJECTS (PHONE: 817-565-2000).

I grant permission for my child, _____, to participate in this project.

Signature of Parent/Guardian

APPENDIX B
PARENT QUESTIONNAIRE

Parent Questionnaire

1. When did your child attend PLDP and for how long?
2. What special speech/language programming or speech therapy has your child received since leaving PLDP?
3. Where does your child attend school?
4. In what grade will your child be enrolled in September?
5. Has your child ever repeated a grade?
6. In what type of classroom (special class, regular class) will your child be placed next September?
7. Does your child presently receive any speech/language programming or speech therapy?
8. In what extra curricular activities does your child participate?
9. What is your child's strongest area of academic achievement?
10. List your child's grades in the following subjects:
Reading _____ History/Social Studies _____
Math _____ Language _____

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