

THE EFFECTIVENESS OF THREE SCREENING TESTS AS  
PREDICTORS OF KINDERGARTEN ACADEMIC ACHIEVEMENT

by

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## Abstract

### The Effectiveness of Three Screening Tests as Predictors of Kindergarten Academic Achievement

The early identification of children who may be "at-risk" of experiencing learning difficulties is of prime concern to educators and researchers. Several screening tests have been developed to identify "at-risk" children. Considerable interest has been shown in the use of these screening instruments. An examination of the literature indicates that there is lack of common agreement as to which screening measures will accurately identify children with potential learning difficulties, however, the literature does suggest that early screening is necessary. Most researchers agree that further study of kindergarten screening batteries will provide valuable information regarding the accurate prediction of elementary school achievement. The rationale for kindergarten screening is that "at-risk" children can be given special treatment before they develop severe learning problems.

The purpose of this early exploratory study was to attempt to determine the validity of three well known instruments, the Brigance K & 1 Screen for Kindergarten

(Brigance, 1987), the Fluharty Preschool Speech and Language Screening Test (Fluharty, 1978), Kaufman's Short Form of the McCarthy Scales of Children's Abilities (Kaufman, 1977), and informal teacher ratings, as predictors of academic achievement in kindergarten, as measured by the Brigance K & 1 Screen for First Grade and the Metropolitan Readiness Test. Correlation coefficients were computed to reveal the predictive validity of each screening test employed. Thirty-nine children enrolled in kindergarten participated in the study.

The results of this study show that there is some support provided for using the Brigance K & 1 Screen for Kindergarten, Kaufman's Short Form of the McCarthy Scales of Children's Abilities, and informal teacher ratings. No support was provided for using the Fluharty Preschool Speech and Language Screening Test. Although many of the correlations obtained were statistically significant, most correlations were relatively low. The results of this study would have been more meaningful if the sample had been greater than 39 subjects.

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## Chapter 1

### Introduction

#### Background of the Problem

During the past two decades, the early identification of children with potential learning difficulties has been of prime concern to educators and researchers. The accurate prediction of Kindergarten children who may be "at-risk" for school failure constitutes a major area of growth in the field of education. Several screening tests have been developed to identify "at-risk" children. These tests feature short administration times and are designed to determine whether a child may have difficulty succeeding in school, or could profit from a specialized educational placement (Meisels, 1986). Considerable interest has been shown in the use of these screening instruments.

According to Fuerth and Forsythe (1980), DeHirsch, Jansky, and Langford's (1966) Predicting Reading Failure stimulated interest in the use of screening batteries to predict school failure. Studies utilizing this approach have yielded varying degrees of success (Haring & Ridgway 1967; Feshbach, Adelman & Fuller 1974; Fletcher & Satz, 1982; Gallerani, O'Regan, & Reinherz 1982; Satz & Friel, 1978; Schmidt & Perino, 1985). The successful outcome of Satz and Friel's (1978) and Fletcher and Satz's (1982)

longitudinal studies led to the development of a screening battery, designed to detect potential reading difficulties, entitled the Florida Kindergarten Screening Battery (Satz & Fletcher, 1982).

An examination of the literature indicates that there is a lack of common agreement as to which screening measures will accurately identify children with potential learning difficulties. However, the literature does suggest that early screening is necessary. Educators and researchers agree that those children who may have difficulty with the learning process should be identified when they enter school and be given special consideration before they develop serious learning problems. Their rationale includes the following:

Observation and experience indicate that prevention is more effective than remediation (Ramsey & Bayless, 1980, p. 25);

Certainly, it is desirable on humane grounds that children should not experience failure longer than necessary (White, 1979, p. 26);

Children who are developmentally unprepared to cope with school face disadvantages that may become lifelong (Uphoff & Gilmore, 1986, p. 11);

It is far more humane to help them (children) succeed by identifying and capitalizing on their strengths, and at the same time working to eliminate their difficulties than it is to just let them fail. Kindergarten screening programs are one way of accomplishing this (Zeitlin, 1976, p. 3);

If children with learning disabilities are correctly diagnosed before they have suffered the trauma of continued failure, and if they receive skilled help from properly motivated and trained educators, they can lead happy and productive lives (Feriden, Jacobson, & Linden, 1970, p. 48);

And early identification of learning problems and subsequent appropriate interventions will prevent or alleviate these problems (Wilson, 1985, p. 182).

The passage of the United States Public Law 94-142 also provides a rationale for early screening. This law mandates a free and appropriate education for all handicapped children. Public Law 94-142 also states that all handicapped children will be identified and evaluated. In the United States, early screening is based on the premise that the earlier the screening the greater the chances for success. The later the identification of problems the more

costly and less effective the remediation (Harrison & Naglieri, 1981).

There is general agreement that "at-risk" children should be identified before they have suffered school failure. It is obvious that the likelihood of success increases the earlier the screening and subsequent intervention occur.

Support for early identification derives from the physical disability or disease model (Keogh and Becker, 1973). The assumptions of this model are that the identifiable condition exists in the child, that diagnosis will lead to better experiences for the child, and that treatment will have greater impact the sooner it commences. Another assumption is that early treatment may prevent secondary compounding problems, for example, disruption of parental and family relationships, confounding emotional conditions, and interpersonal and affective disturbances.

When the physical disability or disease model is applied to an educational setting, a subtle difference must be considered. According to Keogh and Becker, "When we seek to identify preschool or Kindergarten children whom we fear may become learning failures, we are in fact hypothesizing rather than confirming" (Keogh and Becker, 1973, p. 5). Since the learning difficulty or failure in school has not

yet occurred, we are hypothesizing or predicting that these conditions will occur. It is therefore essential to determine the accuracy of Kindergarten screening measures in predicting success in Kindergarten.

### Purpose of the Study

The purpose of this study was to attempt to determine the effectiveness of a selected battery of Kindergarten screening instruments and informal teacher ratings, in predicting success in Kindergarten. Specifically, this study attempted to determine the validity of three well known instruments, the Brigance K & 1 Screen for Kindergarten (Brigance, 1987), the Fluharty Preschool Speech and Language Screening Test (Fluharty, 1978), Kaufman's Short Form of the McCarthy Scales of Children's Abilities (Kaufman, 1977), and informal teacher ratings, as predictors of academic achievement in Kindergarten.

The present study was conducted at an Elementary School in British Columbia. The personnel of this Elementary School were seeking a valid predictor of Kindergarten achievement, to accompany their physical screening battery. They were particularly interested in identifying those children who may experience difficulties succeeding in Kindergarten.

### Questions

This early exploratory study was designed to provide answers to a number of specific research questions. They are:

1. Which measure or combination of measures will most accurately predict success in Kindergarten?
2. Does the Brigance K & 1 Screen for Kindergarten accurately predict academic achievement near the end of Kindergarten, as determined by the Metropolitan Readiness Test and the Brigance K & 1 Screen for First Grade?
3. Does the Fluharty Preschool Speech and Language Screening Test accurately predict academic achievement near the end of Kindergarten, as determined by the Metropolitan Readiness Test and the Brigance K & 1 Screen for First Grade?
4. Does Kaufman's Short Form of the McCarthy Scales of Children's Abilities accurately predict academic achievement near the end of Kindergarten, as determined by the Metropolitan Readiness Test and the Brigance K & 1 Screen for First Grade?
5. Do informal teacher ratings accurately identify children "at-risk" for learning difficulties?

\*\* For the purposes of the present study, "near the end of Kindergarten" refers to May of 1990.

## Hypotheses

In order to answer the preceeding research questions the following hypotheses were generated:

1. The Brigance K & 1 Screen for Kindergarten will accurately predict academic achievement near the end of Kindergarten, as measured by the Metropolitan Readiness Test and the Brigance K & 1 Screen for First Grade.
2. The Fluharty Preschool Speech and Language Screening Test will accurately predict academic achievement near the end of Kindergarten, as measured by the Metropolitan Readiness Test and the Brigance K & 1 Screen for First Grade.
3. Kaufman's Short Form of the McCarthy Scales of Children's Abilities will accurately predict academic achievement near the end of Kindergarten, as measured by the Metropolitan Readiness Test and the Brigance K & 1 Screen for First Grade.
4. Informal teacher ratings will accurately identify children "at-risk" for learning difficulties.

## Definitions of Terms

The definitions of educational terms used in this study are listed below:

Screening refers to a procedure for identifying children who have the characteristics of "at-risk" learners. Screening, in the present study will involve informal

teacher ratings and the administration of the Brigance K & 1 Screen for Kindergarten, the Flurharty Preschool Speech and Language Screening Test, Kaufman's Short Form of the McCarthy Scales of Children's Abilities.

"At-risk" refers to any child whose scores deviate significantly from the normal ranges and/or cut-off scores according to the tests administered. "At-risk" also refers to any child that has difficulty coping with the academic demands of the regular Kindergarten classroom (as determined by teacher ratings).

"Low-risk" refers to any child that is capable of coping with the academic demands of the regular Kindergarten classroom.

Predictive validity refers to the accuracy with which a test indicates future learning success in a particular area as evidenced by correlations between scores on the test and future criterion measures of success.

Learning difficulty refers to failure to meet the learning expectations of the school, by the end of Kindergarten, as determined by a particular level of performance on the Metropolitan Readiness Test, the Brigance K & 1 Screen for First Grade.

Near the end of Kindergarten refers to May of 1990.

Accurately refers to the accuracy with which the predictive measures indicate future academic achievement as



evidenced by correlations between scores on the predictive measures and future criterion measures.

### Significance of the Study

Past researchers have studied the problem of identifying children who are "at-risk" for learning difficulties. These researchers recognized that early screening is necessary (Bradley, 1975; deHirsch et al., 1966; Satz & Friel, 1978; Schmidt & Perino, 1985). These researchers concluded that the early identification of "at-risk" children is essential, however, there is little agreement on the measures to be used to accurately identify these children. The present study attempts to address this need. Specifically, this study will attempt to determine if the Brigance K & 1 Screen for Kindergarten, the Fluharty Preschool Speech and Language Screening Test, Kaufman's Short Form of the McCarthy Scales of Children's Abilities, and informal teacher ratings are valid predictors of Kindergarten success.

Nearly all researchers cite the need for more research into the validity and reliability of screening tests (Meisels, Wiske, & Tivnan, 1984; Wilson & Reichmuth, 1985; Wood, Powell & Knight, 1984). They are concerned over the lack of validity studies for many of the screening measures and they stress the need for reliable and valid tests to assess a child's school potential. Most researchers agree

that further study of Kindergarten screening batteries will provide valuable information regarding the accurate prediction of Elementary school achievement.

This study is designed to assess the validity of three well known instruments, the Brigance K & 1 Screen for Kindergarten, the Fluharty Preschool Speech and Language Screening Test, and Kaufman's Short Form of the McCarthy Scales as predictors of Kindergarten academic achievement.

## Chapter 2

### Review of the Literature

#### Introduction

The early identification of students with potential learning difficulties is of significant concern to educators and researchers. Considerable interest has been shown in the use of screening instruments to identify children who may be at-risk for school failure. Much of the interest in early screening is based on the premise that the earlier the screening the greater the chances for success. The later the identification of problems the more costly and less effective the remediation (Harrison & Naglieri, 1981). deHirsch, one of the leaders in screening and prediction research, asserts that recognizing a child's learning difficulties at an early age could avoid future remedial help (deHirsch, 1966). Educators and researchers generally agree that there is a need to identify children who may be at-risk of subsequent failure. Many researchers have studied the problem of identifying children who are "at-risk" for learning difficulties (Bradley, 1975; deHirsch et al., 1966; Satz & Friel, 1978; Schmidt & Perino, 1985). They concluded that the early identification of at-risk children is essential; however, there is a lack of common agreement as to which screening measures will accurately identify these children. Nearly all researchers cite the

need for more research into the validity and reliability of screening tests (Meisels et. al., 1984; Wilson & Reichmuth, 1985; Wood et. al., 1984). They express concern over the lack of validity studies for many of the screening measures and stress the need for reliable and valid tests to evaluate a child's school potential. Most agree that further study of Kindergarten screening batteries will provide valuable information regarding the accurate prediction of elementary school achievement.

This study is designed to assess the validity of three screening instruments, the Brigance K & 1 Screen for Kindergarten (Brigance, 1987), the Fluharty Preschool Speech and Language Screening Test (Fluharty, 1978), and Kaufman's Short Form of the McCarthy Scales (Kaufman, 1977), as predictors of Kindergarten academic achievement.

#### Review of the Literature

A review of the literature yielded the <sup>①</sup>models for Kindergarten Screening, the early identification of learning disabilities, and current thinking with regard to Kindergarten Screening. This chapter also includes the current Kindergarten screening practices in British Columbia.

## ① Screening Models

Wendt (1979) has described four screening models. The models identified are the medical model, the school readiness model, screening for exceptionality, and screening for curricular programs.

### Medical Model

According to Mayfield (1981), the medical model is frequently identified as a type of developmental screening. The five major areas considered in this model include; physical (hearing and vision), speech and language, cognitive, gross and fine motor, and social-emotional development (Ysseldyke, Thurlow & O'Sullivan 1987; Wendt, 1979).

### School Readiness Model

The school readiness model attempts to identify ready and non-ready children in order to ensure that "the child avoid consistent failure, and the subsequent lowered self-esteem and avoidance behaviors that could develop in the primary grades" (Wendt, 1979, p. 20).

### Screening for Exceptionality

The screening for exceptionality model attempts to identify those children with special or exceptional needs. Kindergarten entrance is viewed as "the ideal time to spot children who are possibly mentally retarded, learning

disabled, or have some other physical or emotional disorder that interferes with classroom learning" (Wendt, 1979, p. 20).

### Screening for Curricular Programs

The screening for curricular programs model uses screening as a device for planning educational programs for all children. Based on a diagnostic-prescriptive model, this approach focuses on individualizing instruction in Kindergarten.

The decision of which of these models to utilize is dependent upon the purposes for screening. For this particular paper, the medical/developmental model was judged to be most appropriate. The reasons for choosing this model are discussed later.

### ② Early Identification of Learning Disabilities

An examination of the literature reveals that there is a lack of common agreement as to which skills are most important to assess at Kindergarten entry and which screening measures are accurate predictors of academic achievement. There is, however, common agreement that the early identification of "at-risk" children is essential.

Interest in the use of screening batteries to predict school failure was stimulated by deHirsch et. al., (1966).

They claim that the factors significantly associated with later performance include: presence or absence of hyperactive, distractible, uninhibited behavior; gross motor patterning; fine motor control; graphomotor ability; human figure drawing (body image); visual-motor integration; receptive language skills; expressive language skills; visual perception; integration of intersensory information; ego strength; and work attitude.

deHirsch et. al., (1966) developed a battery of tests associated with the aforementioned factors and correlated the Kindergarten test results with end-of-second-grade reading achievement test scores. Several of these tests failed to demonstrate strong, predictive ability. Intelligence quotients, measures of home environmental stimulation, gross motor skills, figure-ground discrimination, lateralization, and established handedness did not correlate with second-grade achievement.

The tests which did correlate with second-grade achievement include measures of hyperactive, distractible and disinhibited behavior, fine motor control, graphomotor ability (pencil grip and name writing), human-figure drawings (body awareness); and the Bender Visual-Motor Gestalt Test (Bender, 1938), the five oral language tests (3 receptive tests ie. imitation of a tapped-out pattern, Wepman's Auditory Discrimination Test (Wepman, 1960), the

Peabody Picture Vocabulary Test (Dunn, 1959), and two expressive tests (ie. number of words used in a story; organization of a story), and all reading readiness measures (name writing, letter naming, the Horst Test (Horst, 1958), Gates Matching and Rhyming subtests (Gates & MacGinitie, 1968), word recognition and reproduction of words previously taught).

The results of this study led deHirsch, Jansky and Langford to develop a Predictive Index of ten tests that they believed would correlate with end-of-second-grade reading and spelling achievement. The ten tests included:

Pencil Use

Bender Visual-Motor Gestalt Test (Bender, 1938)

Wepman Auditory Discrimination Test (Wepman, 1960)

Number of Words Used in a Story

Categories

Horst Reversals Test (Horst, 1958)

Gates Word Matching Test (Gates & MacGinitie, 1968)

Word Recognition I

Word Recognition II

Word Reproduction

deHirsch, Jansky and Langford (1966) describe the procedures for administering and scoring these tests in Appendix II of Predicting Reading Failure. They maintain that the Predictive Index should be administered to all



children during the second half of the Kindergarten year. First grade entrance should be based on the child's score and teacher observations.

In Preventing Reading Failure Jansky and deHirsch (1972) continued their study and developed a Modified Predictive Index (MPI). Their MPI was composed of the five best predictive tests: letter naming, word matching, (Gates Reading Readiness subtest) (Gates & MacGinitie, 1968), copy designs (Bender-Gestalt) (Bender, 1938), picture naming, and sentence repetition (Stanford-Binet subtest) (Thorndike, Hagen & Sattler, 1960). The two year study, involved over 400 Kindergarten children, and resulted in the MPI correctly identifying over 75 percent of the children who failed reading at the end of second grade.

In a study by Feshbach, Adelman, and Fuller (1974) involving 572 Kindergarten children, the MPI was 73 percent accurate in predicting second grade reading achievement, however, a high number of false positives were discovered. A false positive can be described as a child identified as having a potential problem when in fact the problem does not exist. In a similar study by Eaves, Kendall, and Critchton (1974), involving 42 Kindergarten children referred by teachers, the accuracy of the MPI was 76 percent, however a high percentage of false positives were detected.

Another Kindergarten Screening Battery developed in the 1960's was that of Haring and Ridgway (1967). Their battery consisted of the following diagnostic tests:

1. Illinois Test of Psycholinguistic Abilities (ITPA)  
(Kirk & McCarthy, 1961)
2. The Detroit Test of Learning Aptitude (four subtests) (Hammill, 1958)
3. PISCI Auditory Discrimination Evaluation (Siedel, 1963)
4. The Wide Range Achievement Test (Jastak & Wilkinson, 1936)
5. The Developmental Test of Visual-Motor Integration (Beery & Buktencia, 1967)
6. The Purdue Perceptual-Motor Survey (Roach & Kephart, 1966)
7. Test of Left Right Discrimination
8. Physical Measurement (ie. height, weight, postural reflexes, muscle tone, x-ray age of hand and wrist bones).

One hundred and six high-risk subjects were selected for this study. These subjects were identified by their Kindergarten teachers, in the initial screening stage of the study, as being high risk in the probability of developing learning problems. The initial screening stage included the teacher's individual behavior analysis for each child. Their analysis focused on problems in the areas of language

development, visual-perceptual adequacy, and fine and gross motor coordination. Careful consideration was also given to specific behaviors which might be indicative of slower than normal development. The statistical analysis of Haring and Ridgway's battery yielded few common learning patterns, and the authors concluded that the teachers' individual behavior analysis may be more effective than the group testing of Kindergarten children.

Perhaps the most widely known early identification study is the long term follow-up study conducted by a Satz and his colleagues. In a series of studies, Fletcher and Satz (1982), Satz and Friel (1974), Satz and Friel (1978), Satz, Friel, and Rudegeair (1976), and Satz, Taylor, Friel, and Fletcher (1978) used discriminant-function analysis to determine the best combination of a set of 22 predictor variables. These variables were longitudinally evaluated with 497 males from Kindergarten until the end of fifth grade. The criterion was teacher's estimates of reading level. The positive outcomes of these studies led to the development of the Florida Kindergarten Screening Battery (Satz & Fletcher, 1982). This instrument is designed to detect potential reading difficulties. The battery consists of the following tests:

1. Finger Localization
2. Peabody Picture Vocabulary Test

3. Developmental Test of Visual-Motor Integration
4. Alphabet Recitation

Gallerani et. al., (1982) examined the relationship between preschool screening data (i.e. the Preschool Screening System (Hainsworth & Hainsworth, 1974), a Parent Questionnaire, the Simmons Behavior Checklist (Reinhertz, Kelfer, Griffin & Holloway, 1977), and the Quincy Observation Scale) (Reinhertz, Kelfer, Griffin & Holloway, 1977), and readiness for first grade, as measured by Kindergarten teachers. The Kindergarten teachers rated each student as; definitely ready, somewhat ready, or not at all ready. The teachers also specified reasons for nonreadiness (i.e. nonreadiness for any reason, nonreadiness due to academic problems, or nonreadiness due to social/emotional problems. Gallerani et al., found that 73.5 percent of children rated as having no academic problems were correctly classified. In addition, 73.9 percent of the children rated as not ready for first grade due to academic problems were correctly classified. Of the children rated as socially/emotionally ready for first grade, 74.3 percent were correctly classified. Only about 48 percent of children rated as not ready due to social/emotional problems were correctly classified. The results of this study led these researchers to conclude that brief cognitive screening at Kindergarten entry is more predictive of functioning in Kindergarten than extensive developmental history data.

A study by Cronin, Arvin, and Brown (1983) assessed the predictive validity of the McCarthy Screening Test (McCarthy, 1978) and SEARCH: A Scanning Instrument for the Identification of a Potential Learning Disability (Silver & Hagin, 1976). This study included 190 Kindergarten children. The criterion measure, gathered at the end of first and second grade, included performance on the Metropolitan Achievement Test (Prescott, Barlow, Hogan & Farr, 1978) and school performance. Results of this study were not supportive of the predictive validity of SEARCH and only marginally support the McCarthy Screening Test.

Harrison and Nagliari's (1981) study compared the scores on Kaufman's (1977) Short Form and the McCarthy Screening Test (McCarthy, 1978) with the Metropolitan Achievement Test criterion measure score, for 53 first grade children. The correlation between Kaufman's (1977) estimated General Cognitive Index and the Metropolitan Achievement Test raw score was .71. Biserial correlations between "at-risk" and "not-at-risk" classifications of the McCarthy Screening Test and Metropolitan Achievement Test raw scores ranged from .43 to .78. Kaufman's (1977) estimated General Cognitive Index correlation was significantly higher than three of the nine McCarthy Screening Test correlations, [ $t$ 's (50) = 3.07, 2.21, 2.14,  $p < .05$ .] Results of this study suggest that Kaufman's (1977)

Short Form may have better predictive validity than the McCarthy Screening Test for this particular sample of first graders.

Naglieri and Harrison (1982) investigated the relationships between the McCarthy Scales General Cognitive Index, the McCarthy Screening Test, Kaufman's Short Form, and the Peabody Individual Achievement Test (Dunn & Marwardt, 1970). Thirty-nine children in grades K to 3 were included in this study. Results indicated that the Estimated General Cognitive Index by Kaufman's Short Form (105.6) was virtually identical to the McCarthy Scales (Full Form) index (105.7). The McCarthy Scales, McCarthy Screening Test, and Kaufman's Short Form all correlated positively ( $p < .01$ ) and significantly with the Peabody Individual Achievement Test (Dunn & Marwardt, 1970), with the exception of the McCarthy Motor Scale. This study suggests that the McCarthy Screening Test and Kaufman's Short Form have approximately equal predictive validity.

A study by Valencia and Rankin (1983) indicated that Kaufman's Short Form estimated General Cognitive Index and actual General Cognitive Index's from the McCarthy Scales are very similar. The authors observed a mean correlation of .90 between estimated and actual General Cognitive Index's for 176 Spanish-speaking children and .92 for 154

English-speaking Mexican-American children of preschool and Kindergarten age.

In another study by Valencia (1984), further evidence for the predictive validity of Kaufman's Short Form is provided. This study included 76 English-speaking and Spanish-speaking children enrolled in grade two. Results suggest that Kaufman's Short Form and the McCarthy Scales predict academic achievement (as measured by the Comprehensive Test of Basic Skills) (CTBS, 1974) about equally well.

Gullo, Clements, and Robertson (1984) examined the efficiency of the Metropolitan Readiness Test and the McCarthy Screening Test in predicting end of Kindergarten and end of first grade achievement. The McCarthy Screening Test was administered to 88 entering Kindergarten children, and the Metropolitan Readiness Test was administered to each subject at the end of Kindergarten. The dependent variable, the Scott Foresman Achievement Test (SFAT), (Wick & Smith, 1981), was administered at the end of first grade. Results indicated that both screening tests significantly predicted later achievement, however, the McCarthy Screening Test proved to be a better predictor in almost all cases. Although the McCarthy Screening Test and the Metropolitan Readiness Test are somewhat predictive, these researchers caution against using either instrument for decision making

purposes of high-risk learners, and recommend that these measures be used as part of a battery of tests.

A two part study, conducted by Funk, Sturmer, and Green (1986), examined the predictive validity of the McCarthy Scales of Children's Abilities. These authors studied the relationship of McCarthy Scales of Children's Abilities performance, prior to school entry, to achievement in Kindergarten, first, and second grades, as measured by the California Achievement Test (California Achievement Test (Tiegs & Clark, 1970) reading and mathematics scores. A stratified sample of 129 preschool children were included in this study. Correlations between scores on the McCarthy Scales of Children's Abilities scores and achievement on the California Achievement Test ranged from  $r = .35$  to  $r = .70$ . These correlations provide support for the predictive validity of the McCarthy Scales of Children's Abilities. The authors examined the children most "at-risk" for later learning problems, and found that children with low General Cognitive Index scores (GCI) (less than 67 or between 68 and 84; 1 - 2 standard deviations below the norm mean) on the McCarthy Scales of Children's Abilities obtained scores on the California Achievement Test which were significantly lower, in all grades, than children scoring within the normal range (greater than or equal to 84) on the GCI. By the end of second grade 94 percent of the children who had GCI scores lower than 68 and 74 percent of those children



who had GCI scores between 68 and 84 "had either failed a grade, been placed in special education classes, or were scoring in the bottom 20 percent of their cohort on the California Achievement Test's in that year" (Funk et al., 1986, p. 181).

Funk et. al., (1986) conducted another study in order to substantiate the results from the previous study. One hundred and eighteen children participated in this study, which only examined end of first grade achievement. The results are similar to those obtained in the previous study. Both studies demonstrate that results on the McCarthy Scales of Children's Abilities obtained prior to school entry, are predictive of achievement in the early grades.

Schmidt and Perino (1985) examined the ability of the Vane Test of Language (Vane, 1975) and the Vane Kindergarten Test (Vane, 1968) to predict academic achievement, potential, and placement in the second grade. The Vane Test of Language and the Vane Kindergarten Test were administered to 378 Kindergarten children. The criterion measures, the Metropolitan Achievement Test (Prescott et. al., 1978) Reading Composite Score, and the Otis-Lennon School Ability Test (Otis & Lesson, 1979) were administered at the end of the second grade. The Multiple Correlation for the Metropolitan Achievement Test Reading Composite Score was .50, and the Multiple Correlation for the Otis-Lennon School

Ability Test was .48. These results indicate that the Vane Kindergarten Test and the Vane Test of Language do predict achievement. These researchers also grouped all second grade subjects into one of three groups: special education, average, and high achievement. Stepwise regression analysis was conducted in order to determine which subtests accurately predicted both the special education group and the high achievement group. Results indicated that a weighted combination of only three subtests from the entire Vane Kindergarten Test and the Vane Test of Language battery could accurately predict 77 percent of special education students and 73 percent of high-achieving children at the end of second grade.

Tsushima, Onorato, Okumura, and Sue (1983) examined the predictive validity of the STAR: Screening Test of Academic Readiness (Ahr, 1966). They correlated STAR test scores, obtained at the beginning of the Kindergarten year, with achievement test scores and with teacher ratings, obtained at the end of the Kindergarten year. The subjects of this study were 59 boys attending a private-school with superior academic standards. With the exception of the correlation between the Screening Test of Academic Readiness and the Metropolitan Readiness Test Numbers Subtest, no correlation coefficients between the STAR scores and the Metropolitan Readiness Test scores were statistically significant. There was the low positive correlation ( $r = .23$ ) between the STAR

scores and the teachers' academic ranking of the students. Tsushima et. al., (1983) caution against using instruments recommended from other studies for predictive purposes. Even if correlation coefficients are available, a local revalidation may be necessary due to socioeconomic, cultural, teaching emphasis and peer pressure variations.

Jacobsen (1990) examined the ability of the Draw-a-Person Test (Harris, 1963), the Mann-Suiter Visual Motor Screen (Mann, Suiter, & McClung, 1987), the Kindergarten Language Screening Test (Gauthier & Madison, 1973) and the Deverell Test of Letter and Numbers (Deverell, 1974) to predict grade three achievement in reading, mathematics, vocabulary and language. The four screening measures were administered during Kindergarten, with the criterion measure, the Canadian Test of Basic Skills (Hieronymus et al., 1976) administered at the end of the third grade. Two entire age cohorts (957 students) enrolled in 30 schools in one Canadian school district were included in this study. The results of the study indicate that all four Kindergarten screening measures were moderate predictors of grade three achievement in reading, mathematics, vocabulary, and language. She reports that the most effective predictors for reading, vocabulary and language related achievement measures were the Kindergarten Language Screening Test and the Deverell Test of Letter and Numbers. The best predictors for mathematics were visual-motor ability and

expressive language. Jacobsen (1990) states that "the positive relationships between Kindergarten screening measures and achievement measures demonstrates that the use of standardized test measures can be valuable in a screening program". This author also reports that "a combination of standardized test measures with reports of teacher judgement would likely improve the assessment process" (p. 141).

A meta-analysis of 58 studies on the early identification of learning difficulties correlated several predictors with later reading achievement (Horn and Packard, 1985). The predictor measures were administered during Kindergarten or first grade. The follow-up measures were administered during the elementary school years. Depending on the predictor variable being studied, the sample size ranged from 494 (gross motor skills) to 6,401 (receptive language tests). Their findings are reported in the following table (Horn & Packard, 1985, p. 602) which "shows mean correlations and standard deviations for the predictor variables broken down into those correlations in which reading achievement was measured at the end of first grade and those in which achievement was measured in second or third grade":

Mean Correlations and Standard Deviations by  
Variable for Two Grade Levels in Meta-Analysis  
(Horn & Packard, 1985, p. 602)

Variable	First grade				Second/third grades			
	No. r's	N	Mean r	SD	No. r's	N	Mean r	SD
<u>Language</u>								
Written	5	1,561	.61	.11				
Oral	19	4,168	.44	.18	8	684	.51	.11
Receptive	30	6,401	.53	.12	10	1,718	.58	.13
<u>Sensory</u>								
Figure drawings	23	4,317	.43	.14	9	1,684	.33	.04
Auditory skills	17	3,616	.36	.06	7	230	.40	.00
Visual skills	20	3,152	.46	.16	9	795	.32	.00
Integration	12	1,858	.24	.10	4	395	.40	.07
<u>Behavioral-emotional</u>								
Attention/distract.	3	740	.71	.08	5	307	.43	.14
Externalizing	7	1,524	.46	.15	3	271	.78	.19
Internalizing	3	844	.56	.00	3	271	.72	.00
Self-help/social skills	4	481	.52	.20	4	448	.43	.22
<u>Soft neurological</u>								
Fine motor skills	3	751	.47	.00	5	463	.44	.00
Gross motor skills	3	494	.36	.00	6	518	.29	.12
Cerebral dominance/handedness	—	—	—	—	—	—	—	—
<u>IQ</u>								
Group tests	4	1,126	.59	.10	—	—	—	—
Individual tests	5	1,154	.46	.07	5	1,145	.54	.00
Teacher Ratings	5	1,151	.51*	.08	5	871	.46*	.00

\* Corrected for attenuation due to variation in criterion reliability only.

The meta-analysis indicated that the single best predictors for later reading achievement were (from best to least):

1. assessments of attention/distractibility
2. language tests (written and receptive)
3. internalizing behavior measures (ie. anxiety, depression)
4. intelligence tests
5. soft neurological indicators
6. sensory measures (ie. figure drawings, visual skills...)

Another approach to early identification is the use of teacher completed rating scales. Since the teacher has close daily contact with each child, he/she becomes an important source of information regarding educational risk. Therefore, Kindergarten teachers assume added responsibility as they are asked to identify problems before such problems are well developed (Glazzard, 1982). Several recent research studies indicate that teachers are effective in identifying children "at-risk" for learning difficulties, and support the use of teacher ratings as part of early screening programs (Becker & Snider, 1979; Glazzard, 1982; Tollefson, Rodriguez & Glazzard, 1985). Haring and Ridgway (1967) and Ferinden, Jacobsen, and Linden (1970) concluded that teachers can predict with 80 percent accuracy which

children will experience academic failure. Feshbach et. al., (1974) found that teacher judgements tended to be equally as effective as formal tests in correctly identifying learning disabled children.

In a long range study, Glazzard (1982) examined the predictive efficiency of the Teacher Estimate of Kindergarten Pupil's Abilities (Kirk Teacher Rating Scale) (Kirk, 1966) with reading readiness and reading achievement tests. The Gates-MacGinitie Reading Tests: Readiness Skills, (Gates & MacGinitie, 1968) and the Gates-MacGinitie Reading Test (Gates & MacGinitie, 1965) scores at the end of first, second, third, and fourth grades served as the criterion. Results indicated that the Kirk Teacher Rating Scale was a significant predictor of vocabulary and reading comprehension scores in first grade achievement tests. The Gates-MacGinitie Readiness Test was a more efficient predictive measure for second and third grade comprehension. Both the Kirk Teacher Rating Scale and the Gates-MacGinitie Readiness Test were uniquely predictive of reading comprehension in the fourth grade. These results led Glazzard to conclude that the Kirk Teacher Rating Scale was an efficient and cost effective approach for identifying "at-risk" children.

Two studies, conducted by Tollefson et. al., (1985), examined the predictive validity of the Kindergarten Teacher

Rating Scale (Glazzard & Kirk, 1979). The first study included a sample of 137 boys and 136 girls. The teachers rated each subject on the Kindergarten Teacher Rating Scale at the end of Kindergarten. The Science Research Associates Achievement Series (Nashlund, Thorpe & Lefever, 1978), administered at the beginning of second grade, served as the dependent variable. The second study included a sample of 144 boys and 136 girls. The teachers rated each subject on the Kindergarten Teacher Rating Scale at the end of Kindergarten. All subjects completed the End of Level 1 Readiness Test at the beginning of first grade, and the Stanford Achievement Test (Madden, Garner, Rudman, Karsen & Marvin, 1973) at the end of first grade. Multiple regression analysis determined that the Kindergarten Teacher Rating Scale was a significant predictor of the reading achievement of both boys and girls at the end of first grade and the beginning of second grade.

Swartz and Walker (1984) utilized a criterion-referenced teacher rating scale, entitled the Kindergarten Performance Profile (Walker & Swartz, 1981), and the California Achievement Test (Tiegs & Clark, 1970) to examine the relationship between teacher ratings of Kindergarten classroom skills and second grade achievement. The subjects were 225 girls and 257 boys. Results indicated that work skills were related to achievement for both boys and girls.



Teacher ratings of social skills were related to second grade achievement for girls but not boys.

Hoge and Coladari (1989) reviewed the literature on teacher judgement. These authors concluded that teacher judgement about student achievement is generally accurate, however, the levels of accuracy vary across teachers.

### Current Literature Supporting Screening

Margie Mayfield's general report on Kindergartens in British Columbia (1981) includes a Chapter on the Assessment of Kindergarten children. A section of this chapter presents the results to her survey questions regarding Kindergarten screening. The results of her survey indicate that an average of eighty-three percent of all the teachers, parents and administrators who responded were in favour of screening (range: 79 percent to 88 percent). This finding is supported by the content analyses of the respondent's written comments. The following are two comments included in Mayfield's report:

The spotlight is on Kindergarten. We are finally beginning to see the value and the necessity of identifying high-ability and "at-risk" children at an early age. It has been shown, statistically, that early intervention and remediation are dramatically more successful in Kindergarten/First

Grade than later intervention in the intermediate grades. (Kindergarten teacher)

I feel that screening should be for the purposes of informing the teachers and parents of the areas the child needs to develop to become academically and emotionally and socially ready for First Grade. (Kindergarten parent)

Educators and researchers agree that screening is valuable. The following are their comments in support of screening:

The importance of identifying failure-prone or "at-risk" children before they enter school is now based on solid evidence showing that early identification coupled with remedial assistance at the preschool level can help reduce the risk of subsequent grade retention (from Simner, 1983, p. 17).

... early screening is essential for educational accountability (Judy, 1986, p. 87).

... screening instruments have limitations, but they provide educators information critical to children's successful learning (Judy, 1986, p. 87).

Thus for both screening and readiness testing, using appropriate tests for acceptable purposes will yield information that, when linked to individualized program planning, can improve a child's first-time-to-school experience (Meisels, 1986, p. 92).

... new responsibilities for schools to identify children who may be "at-risk" for learning problems and to place these children in appropriate educational environments (Meisels, 1987, p. 4).

An area of concern for educators and psychologists is the identification of children who have learning problems in elementary schools (Smith & Smith, 1988, p. 264).

Currently, there is concern because it appears that more and more children are "at-risk" for Kindergarten failure (Charlesworth, 1989, p. 5).

During the 80's, there has been a trend toward identifying high-risk children at all socioeconomic levels who may not be ready for Kindergarten (Charlesworth, 1989, p. 5).

Early identification may be the most crucial factor influencing the eventual school success of children with learning disabilities (from Rafoth, 1988, p. 186).

Educators and researchers agree that screening is a necessary procedure for elementary schools. Although there are some limitations to screening, the benefits far outweigh the costs.

#### Reasons for Using Screening Model and Screening Instruments

The medical/developmental model for screening was chosen since the Elementary School's purposes for screening are closely related to this particular model. The school chosen for this study, adheres to the British Columbia Ministry of Education Curriculum for Kindergarten. The Elementary School's intention for screening was to identify children who were "at-risk" of experiencing learning difficulties. Their belief was that the presence of such children would indicate the need for special educational programming and that the early identification of children "at-risk" of experiencing learning difficulties could result in the provision of remedial programming designed to alleviate or eliminate the difficulties.

The review of the literature, the Kindergarten Curriculum, and the outcome goals of the Elementary School's Kindergarten program, influenced the choice of instruments for this particular study.

In the "Early Detection of Learning Problems: Questions, Cautions, and Guidelines," Keogh and Becker (1973) differentiate the medical model of identifying a condition which exists in the child from the educational model for predicting that a child will experience difficulty in the educational setting. They emphasize that in the educational setting we are predicting rather than confirming. Keogh and Becker raise an important question with regard to the prediction of learning problems; How valid are the identifying or predictive measures? According to the authors, "a critical consideration in validity questions is the definition of outcome goals against which predictions are based" (Keogh & Becker, 1973, p. 6). The validity of a particular screening test or screening battery is clearly related to the goals defined. The most efficient and accurate screening measures are those which tap the abilities required in the educational program. If reading will be part of the educational program, the screening should evaluate prereading skills, and any other abilities necessary to succeed at reading.

Judy (1986) makes a similar statement to Keogh and Becker's (1973). According to Judy, "the ultimate test of a screening battery or test is the usefulness of the information it provides. Thus, curriculum should dictate the type of screening instrument used" (Judy, 1986, p. 87).

Durkin's (1987) study of Kindergarten testing practices indicates that the two main purposes of testing are: to; discover what a child knows in relation to the contents of the instructional programs in order to determine appropriateness of such programs and to; evaluate the results of instruction in order to make decisions concerning what instruction should come next. Durkin shares the concerns of most researchers that testing should be related to instructional decisions and programs.

The measures chosen for the present study reflect the abilities required to succeed in Kindergarten. The justification of the instruments chosen is discussed in Chapter Three.

#### Current Kindergarten Screening Practices in Vancouver, B.C. and the Lower Mainland

Dowler (1990) conducted a survey in order to determine the Kindergarten screening practices in British Columbia. Fifty-eight school districts were included in the survey.

Three of the five survey questions are directly related to Kindergarten screening. These three questions are as follows:

1. Currently there is;isn't; developmental screening or readiness testing in our district.
2. There was some; wasn't any such screening or assessment in our district.
3. The issue of Preschool or Kindergarten screening has, has not been clearly addressed in our district and therefore there is; is not some confusion as to what early childhood screening is.

In response to these three questions, Dowler (1990) obtained the following results:

1. Currently there is; isn't; developmental screening or readiness testing in our district.

Twenty-seven of fifty-eight districts, or 47 percent, indicated that there is some form of screening or readiness testing in their districts, while thirty-one of fifty-eight, or 53 percent, reported that there isn't. Most of the districts, that reportedly do some form of testing, have developed their own screening programs which meet their particular needs and guiding philosophies. Many of the 53 percent, who reported that they did not screen or test, commented that they administer various tests when it is

necessary, (ie. when the teacher notices that there is a problem).

2. There was some; wasn't any such screening or assessment in our district.

Thirty-nine of fifty-seven districts, or 68 percent, indicated that there was some form of screening or testing in the past, while 32 percent reported that there was not. Formal screening or testing has been viewed by the majority of districts as worthy of consideration. Many of the districts that no longer screen or test indicated that the process was too cumbersome or that it no longer served their purposes.

3. The issues of Preschool or Kindergarten screening has: has not been clearly addressed in our district and therefore there is; not some confusion as to what early childhood screening is.

It should be noted that only forty-seven districts responded to this question. Of the forty-seven, eighteen reported that the issue has been clearly addressed, while twenty-six stated that it has not. Nineteen of the forty-seven districts indicated that there was confusion regarding early childhood screening, while twenty said that there was not any confusion. The following are examples of the comments made in response to this question:



"There is no obvious need for screening."

"Classroom observations have made screening unnecessary."

"Appropriate screening measures have not as yet been defined by our Ministry of Education."

"It (screening) is not an issue."

"Yes, Yes, This issue (screening) is not clear."

"This issue will be revisited at the dual entry system."

"Entrance to Kindergarten has been a parental decision in School District # \*\*."

"Additional discussions are taking place in an attempt to develop a clearer understanding."

### Summary

The early identification of children with potential learning difficulties is of major concern to educators and researchers. Educators and researchers agree that screening is valuable. Their support for screening is based on the philosophy that appropriate early intervention can prevent school failure. Although research indicates a definite need for Kindergarten screening, there is a lack of agreement as to which variables are effective predictors of academic success. Nearly all researchers cite the need for more research into the validity and reliability of screening tests (Meisels et. al., 1984; Wilson & Reichmuth, 1985; Wood et. al., 1984). Many researchers agree that further study of Kindergarten screening batteries will provide valuable information regarding the accurate prediction of elementary school achievement. Dowler (1990) conducted a survey in

*Problem*

order to determine the Kindergarten screening practices in British Columbia. Forty seven percent of these school districts indicated that there is some form of screening and readiness testing in their districts, while fifty three percent reported that there is not. Sixty eight percent indicated that there was some form of screening or testing in the past, while thirty two percent reported that there was not.

## Chapter Three

### Research Methodology

#### Introduction

A growing number of schools have been utilizing screening instruments in order to identify children with potential learning difficulties. Many educators have targeted Kindergarten entrance as an ideal time for the assessment of a child's strengths and weaknesses. Wendt (1978) states that the premise behind early screening is the belief that early intervention and remediation of problems will result in greater educational success for the child. Many researchers have studied the problem of identifying children who are "at-risk" for learning difficulties (Bradley, 1975; deHirsch et al., 1966; Satz & Friel, 1978; Schmidt & Perino, 1985). These researchers concluded that the early identification of "at-risk" children is essential, however, there is a lack of common agreement as to which screening measures will accurately identify these children. Nearly all researchers cite the need for more research into the validity and reliability of screening tests (Meisels et. at., 1984; Wilson & Reichmuth, 1985; Wood et. al., 1984). These researchers express concern over the lack of validity studies for many of the screening measures and stress the need for reliable and valid tests to evaluate a child's school potential. Most researchers agree that further study

of Kindergarten screening batteries will provide valuable information regarding the accurate prediction of Elementary school achievement. This study is designed to assess the validity of three screening instruments, the Brigance K & 1 Screen for Kindergarten (Brigance, 1987), the Fluharty Preschool Speech and Language Screening Test (Fluharty, 1978), and Kaufman's Short Form of the McCarthy Scales (Kaufman, 1977), as predictors of Kindergarten academic achievement. Chapter two is a review of the literature, which includes the models for Kindergarten Screening, the early identification of learning difficulties, current thinking with regard to Kindergarten screening, and the current Kindergarten screening practices in Vancouver, British Columbia and the lower mainland.

This chapter presents the research methodology for the study. A description of the Brigance K & 1 Screen for Kindergarten and First Grade (Brigance, 1987), the Fluharty Preschool Speech and Language Screening Test (Fluharty, 1978), Kaufman's Short Form of the McCarthy Scales of Children's Abilities (Kaufman, 1977), the Metropolitan Readiness Test (Nurss, 1976), and the Informal Teacher Rating is provided. The reasons for selecting these measures to collect the data are also presented. The last section of the chapter describes the design of the study. The chapter concludes with a brief summary.

### Instrumentation

The following instruments were chosen for the present study:

1. Brigance K & 1 Screen for Kindergarten (Brigance, 1987)
2. The Fluharty Preschool Speech and Language Screening Test (Fluharty, 1978)
3. Kaufman's Short Form of the McCarthy Scales of Children's Abilities (Kaufman, 1977)
4. Brigance K & 1 Screen for First Grade (Brigance, 1987)
5. Metropolitan Readiness Test (Level II) (Nurss, 1976)
6. Informal teacher ratings

### Description of Instruments

#### Brigance K & 1 Screen for Kindergarten and First Grade

The stated purpose of the Brigance K & 1 Screen for Kindergarten and First Grade is to identify children who may need further evaluation to see if special services are necessary.

### Organization of the Scale

The following subtests are included in the Kindergarten Screen:

- Personal Data Response
- Color Recognition
- Picture Vocabulary
- Visual Discrimination
- Visual-Motor Skills
- Gross Motor Skills
- Rote Counting
- Identification of Body Parts
- Follows Verbal Directions
- Numeral Comprehension
- Prints Personal Data
- Syntax and Fluency

The following subtests are included in the First Grade Screen:

- Personal Data Response
- Color Recognition
- Picture Vocabulary
- Visual Discrimination
- Visual-Motor Skills
- Draw-A-Person (Body Image)
- Rote Counting
- Recites Alphabet

Numeral Comprehension

Recognition of Lowercase Letters

Auditory Discrimination

Prints Personal Data

Numerals in Sequence

### Scoring Procedures

Responses are scores as 1 or 0. The highest possible score is 100. The authors recommend that students scoring 69.5 or below be referred for additional assessment. A follow-up on students scoring between 70 and 74.5 is also suggested. The academic records for these students should be reviewed at a future date. Those students not making acceptable progress at that time should be tested further.

This is a criterion referenced test. The Brigance K & 1 Screen for Kindergarten and First Grade's (Brigance, 1987) assessments are similar to other measures (ie. the Metropolitan Readiness Test) (Nurss, 1976), and many professionals in the field of testing concur that the subtests on the Brigance K & 1 Screen for Kindergarten and First Grade are appropriate for Kindergarten and First Grade Screening. The Brigance K & 1 Screen for Kindergarten can be administered prior to Kindergarten entrance as well as throughout the Kindergarten year. Similarly, the Brigance K & 1 Screen for First Grade can be administered prior to

First Grade entrance as well as throughout the First Grade year.

Administration Time

10 - 12 minutes

Although no studies using the Brigance K & 1 Screen appear in the literature, a test review by Helfeldt (1984) indicates that this is a well organized criterion referenced test. Helfeldt (1984) also indicates that the Brigance K & 1 Screen has sufficient content validity since the "assessments are similar to the subtests in traditional reading readiness tests such as the Metropolitan Readiness Tests (1976) or the Early Detection Inventory (1967)" (Helfeldt, 1984, p. 821). It is also interesting to note that during the field-testing of the Brigance K & 1 Screen, professionals in the field of testing concurred that the subtests are appropriate for Kindergarten and First Grade Screening. The states that participated in the field-testing of the Brigance K & 1 Screen (1987) include; California, Colorado, Florida, Illinois, Indiana, Kentucky, Mississippi, Missouri, New Mexico, North Carolina, Ohio, Pennsylvania, Tennessee, and Texas.

The Brigance K & 1 Screen also includes subtests which have been found to be the best predictive measures of reading readiness. Jansky and DeHirsch (1972) include



letter naming, picture naming, and visual-motor integration as the best predictive tests in their book Preventing Reading Failure. In addition, Adelman and Feshbach (1971), indicate that readiness skills for reading include adequate eye-hand coordination, visual discrimination, and the ability to follow simple directions.

Other reasons for using the Brigance K & 1 Screen include the following:

- it is easy to administer
- it has short administration time (10 - 12 minutes)
- it is criterion referenced, which purportedly helps one plan instruction for an individual (Helfeldt, 1984)
- it has sufficient content validity
- the picture cards are large, mostly colorful, simple, and attractive
- it includes subtests which have been found to be the best predictive measures of reading readiness
- and in a test review of the Brigance K & 1 Screen, John P. Helfeldt states that, "the Brigance K & 1 Screen for Kindergarten and First Grade is a well organized criterion referenced test designed to assist in the early identification of individuals who need further testing. It appears to have descriptive validity, as it has been widely field tested and its format and content are similar to

other well established tests" (Helfeldt, 1984, p.822).

### Fluharty Preschool Speech and Language Screening Test

The purpose of this screening test is to identify children in the 2 to 6 year age range that need comprehensive speech and language evaluations.

### Organization of the Scale

The following four subtests are included in this scale:

Identification

Articulation

Comprehension

Sentence Repetition

### Scoring Procedures

All items on the Fluharty Preschool Speech and Language Screening Test are scored as correct or incorrect. Each correct response receives one point. The child's score on each of the four subtests is compared with the cutoff scores prescribed for his/her age level. These scores are delineated for 12 month intervals (ie. 2, 3, 4, 5, and 6 years) for each of the subtests. A child is considered to fail the screening test if one or more of his four scores fall below the cutoff scores for the child's age group.

### Standardization

The Flurharty Preschool Speech and Language Screening Test was standardized on 2147 children ranging in age from two through six years. Four racial or ethnic backgrounds, three socio-economic classes and various geographical areas were included in the standardization. One hundred seventy children from Vancouver, British Columbia were included in the sample.

### Reliability

Intertester and intratester reliability coefficients are reported in the manual. Intratester reliability was determined by retesting 50 children from the standardization sample within six weeks of the first administration. A panel of five speech pathologists was selected to determine the test's intertester reliability. This procedure consisted of a second examiner readministering the screening test to ten children from the standardization sample. The entire panel scored each child's responses during the readministration. The following table shows the Pearson product-moment correlations for intratester and intertester reliability:

Table 1Correlations for Intratester and Intertester Reliability

Measure	Identi- fication	Artic- ulation	Compre- hension	Repe- tition	Mean
Intratester	.98	.99	.95	.96	.91
Intertester	1.00	.87	.99	.98	.96

The correlations range from .87 to 1.00 and provide support for the reliability of the test.

Validity

In order to establish the test's validity, the correlation between 211 children's screening test performance (pass/fail) and the implications of his or her speech evaluation (needs therapy/does not need therapy) was computed. The Pearson product-moment correlation was computed at .897, which supports the validity of the instrument.

Administration Time

6 minutes

A study by Illerburn, D., Haines, L. and Greenough P. (1985) reports that the Flurharty Preschool Speech and

Language Screening Test yielded a high correlation (.79) with a criterion language measure consisting of the TACL, TOLD, and CELI.

- \*\* TACL - Test for Auditory Comprehension of Language  
 TOLD - Test of Language Development  
 CELI - Carrow Elicited Language Inventory

The Fluharty Preschool Speech and Language Screening Test correctly identified 90 percent of children with language problems, while missing 10 percent, of the 136 children included in the study.

Other reasons for using the FPSLST include the following:

- it is easy to administer (ie. directions for administration and scoring are precise)
- it has a short administration time (6 minutes)
- it measures receptive as well as expressive language (Adelman & Feshbach 1971)
- it has an articulation component
- there are tangible or stimulus objects are provided for the subject
- it has a sentence repetition subtest (sentence repetition has been found to be one of the best predictors of reading success by Jansky & deHirsch) (1972)

- according to Helfeldt (1984) the "Brigance Screen does not assess language development to the same degree as it does the other areas. While personal data responses, auditory discrimination and picture vocabulary may measure language functioning, they are all relatively simple tasks, relying primarily on the single word level of expression. The syntax and fluency screen for Kindergarten is very general and informal. That is, the two performance criteria of talking in complete sentences and using understandable speech "most of the time" may be assessed by any one or a combination of factors such as interviewing a parent or teacher, observing the child in a social situation, noting the possible verbal responses when other assessments are administered, engaging the child in "formal or informal" conversation, encouraging the child to talk about pictures such as those used in other parts of the Brigance Screen." (Heldfelt, 1984, p. 82). The Fluharty Preschool Speech and Language Screening Test will serve as an additional language measure
- it is a standardized measure (was standardized on 2147 children, ages two through six, from four racial or ethnic backgrounds, three socioeconomic classes, and a variety of geographical areas)
- and the picture cards are colorful and attractive.

### Kaufman's Short Form of the McCarthy Scales of Children's Abilities

This test is a short form of the McCarthy Scales of Children's Abilities developed by Alan, S. Kaufman (1977) to be used for rapid screening of preschool, Kindergarten, and First Grade children.

#### Organization of the Scale

This short form is one-third of the McCarthy Scales of Children's Abilities. Seven major criteria, including statistical information about the test, served as a basis for the selection of the short form.

Kaufman's (1977) criteria are listed below:

1. The short form should include some tests which, if placed at the beginning of the subtest, will serve as icebreakers and will help lead the child gradually to oral responding. McCarthy (1972, pp. 46-47) discusses the importance of the test sequence for children in the 2 1/2 to 8 1/2 year range, particularly for young and shy children.
2. The proportions of Verbal, Perceptual-Performance, Quantitative, and Memory tests selected for the short form should be similar to the proportions that characterize the complete General Cognitive Scale. Thus, the six tests should be apportioned

as follows: two or three from the V Scale; two or three from P; and one or two from Q. In addition, one or two Memory tests should be among those chosen from the V, P, and Q Scales.

3. The tests selected for the short form should correlate relatively well with the total score on the General Cognitive Scale.
4. The short form should assess as wide a variety of mental functions as possible within the brief testing time.
5. If possible, tests should be selected for the short form which have been found not to differentiate significantly between boys and girls (see Kaufman & Kaufman, 1973b). Since no tests consistently favored whites or blacks in Kaufman and Kaufman's (1973a) study, race differences were not a factor in selecting tests for the short form.
6. The short form should be selected with particular attention paid to the needs and abilities of children aged 3 to 6 years. Thus, when data are used as guides in selecting the tests (see criteria 3 and 5, above), the data for children above age 6 will be relatively less important than the data based on the younger groups of children.



7. Other things being equal, a test which is relatively short to administer or score is to be preferred to one that requires more time.

(Kaufman, 1977, p. 151)

The following subtests were chosen for the short form of the McCarthy:

Puzzle Solving

Word knowledge

Numerical Memory

Verbal Fluency

Counting and Sorting

Conceptual Grouping

After selecting the six tests, "equations were derived to permit computation of a child's estimated GCI; reliability coefficients were computed; correlations between short form and the entire General Cognitive Scale were computed; correlations with other tests were obtained; and the standard error of estimate was determined" (Kaufman, 1977, p. 151-152).

### Scoring Procedures

The six subtests are administered and scored according to the McCarthy (1972) manual. The child's weighted raw scores on the subtests are summed, and regression equations for each quarter year between the ages 2 - 6 and 8 - 6 years

are used to convert this sum to an estimated General Cognitive Index (GCI;  $M=100$ ,  $SD=16$ ).

### Standardization

The standardization sample of the McCarthy Scales (1972) was used to develop the short form. The standardization sample consisted of 1032 children ranging in age from two-and-a-half years to eight-and-a-half years. This sample was stratified on age, sex, color, father's occupation, and geographic region.

### Reliability

Data on 125 of the children in the standardization sample who were given the McCarthy (1972) a second time following a one month interval were used to compute test-retest coefficients for the short form at ages three to three-and-a-half, five to five-and-a-half, and seven-and-a-half to eight-and-a-half. In addition, the following table shows the split-half reliability coefficients of the short form, correlations between the short form and the complete General Cognitive Scale, and modified short-form - correlations.

Table 2

Reliability of the McCarthy Short Form and Coefficients of Correlation Between the Short-Form and "Long-Form" Scores

Age Level	N	Split-half reliability	Correlations with general Cognitive Score	Modified correlations with general Cognitive Score
2 1/2	102	.89	.89	.83
3	104	.91	.88	.84
3 1/2	100	.91	.93	.89
4	102	.84	.89	.81
4 1/2	104	.90	.93	.88
5	102	.92	.92	.88
5 1/2	104	.90	.93	.87
6 1/2	104	.81	.92	.82
7 1/2	104	.90	.94	.89
8 1/2	106	.86	.92	.84
Mean coefficient		.88	.92	.86

\* Table 3 from Kaufman, 1977, p. 156

Validity

Data obtained on a group of 35 children aged six to six-and-a-half were used to obtain correlations between the short form and the Stanford-Binet (Thorndike et al., 1968) IQ, the Wechsler Preschool and Primary Scale of Intelligence (Wechsler, 1967) Full-Scale IQ, and overall achievement on the Metropolitan Achievement Test (Prescott et. al., 1978). The short form estimate on the GCI correlated .78 with the Stanford-Binet IQ, .74 with the Wechsler Preschool and Primary Scale of Intelligence Full-Scale IQ and .50 with the

Metropolitan Achievement Test. Thus some evidence is provided for the short form's concurrent and predictive validity.

Several studies support the reliability and validity of Kaufman's Short Form. These will be discussed later in this paper.

Although the short-form appears to have sufficient reliability and validity, Kaufman (1977) suggests that the short form be used only when administration of the entire battery is unfeasible.

#### Administration Time

20 minutes

Four studies appearing in the literature (Harrison and Naglieri, 1981; Naglieri and Harrison, 1982; Valencia and Rankin, 1983; Valencia, 1984) indicate that Kaufman's (1977) Short Form of the McCarthy Scales of Children's Abilities is a reliable and valid screening instrument. Harrison and Naglieri (1981) compared the scores on Kaufman's (1977) short form and the McCarthy Screening Test with the Metropolitan Achievement Test criterion measure score. Fifty-three first grade children were included in the study. The correlation between Kaufman's (1977) estimated General Cognitive Index (GCI) and the Metropolitan Achievement Test

(Prescott et. al., 1978) raw score was .71. Biserial correlations between "at-risk" and "not-at-risk" classifications of the McCarthy Screening Test and Metropolitan Achievement Test raw scores ranged from .43 to .78. Kaufman's estimated GCI correlation was significantly higher than three of the nine MST correlations,  $t$ 's (50) = 3.07, 2.21, 2.14;  $p < .05$ . Results of this study suggest that Kaufman's Short Form may have better predictive validity than the McCarthy Screening Test for this sample of first graders.

Naglieri and Harrison (1982) investigated the relationships among the McCarthy Scales of Children's Abilities General Cognitive Index, the McCarthy Screening Test, Kaufman's Short Form, and the Peabody Individual Achievement Test (Dunn & Marwardt, 1970). Thirty-nine children in grades K to 3 were included in this study. Results indicated that the Estimated General Cognitive Index by Kaufman's Short Form (105.6) was virtually identical to the McCarthy Scales (full form) index (105.7). The McCarthy Scales, McCarthy Screening Test, and Kaufman's Short Form all correlated positively and significantly ( $p < .01$ ) with the Peabody Individual Achievement Test, with the exception of the McCarthy (1972) Motor Scale. This study suggests that McCarthy Screening Test and Kaufman's Short Form have approximately equal predictive validity.

A study by Valencia and Rankin (1983) indicates that Kaufman's Short Form estimated GCI and actual GCI's from the McCarthy Scales are very similar. The authors observed a mean correlation of .90 between estimated and actual GCI's for 176 Spanish-speaking children and .92 for 154 English-speaking Mexican-American children of preschool and Kindergarten age.

In another study by Valencia (1984), further evidence for the predictive validity of Kaufman's Short Form is provided. This study included 76 English-speaking and Spanish-speaking children enrolled in grade two. Results suggest that Kaufman's Short Form and the McCarthy Scales predict academic achievement (as measured by the Comprehensive Test of Basic Skills) (CTBS, 1974) about equally well.

Other reasons for using Kaufman's (1977) Short Form include the following:

- according to the teachers at the Elementary School chosen for this study, these measures are similar to the skills required to succeed in Kindergarten
- it has a short administration time of 20 minutes (not feasible to administer entire battery)
- it is a psychometrically sound instrument

- and the directions for administration and scoring are precise.

### Metropolitan Readiness Test (Form II)

This test is intended to assess students' preparedness for First Grade. It provides a general assessment of reading readiness.

### Organization of the Scale

The following subtests are included in the scale:

Beginning Consonants

Sound-Letter Correspondence

Visual Matching

Finding Patterns

School Language

Listening

Quantitative Concepts

Quantitative Operations

### Scoring Procedures

All test items are scored as correct or incorrect. Each correct response receives one point. Raw scores are converted to percentile ranks and stanines. Raw scores were used for this particular study.

### Standardization

The standardization program included two full-scale national testing programs. Normative data were obtained from a stratified random sample of school systems in the United States. The standardization sample consisted of 66,254 children in Kindergarten and First Grade.

### Reliability

Split-half, KR-20, and alternate form reliability estimates are provided in the manual. The split-half reliability coefficients range from .72 to .95. KR-20 coefficients range from .73 to .94. The alternate form reliability coefficients range from .72 to .88.

### Validity

The content validity of the Metropolitan Readiness Test (Nurss, 1976) was established through an analysis of the beginning reading process and an extensive review of the reading research literature. A sequential list of the skills necessary for beginning reading was prepared and tests measuring these skills were developed and examined during the item analysis programs of 1972 and 1973.

The predictive validity of the Metropolitan Readiness Test can be demonstrated by showing that scores on the Metropolitan Readiness Test administered to First Grade pupils in the fall are closely related to achievement test



scores in the spring of the same school year. Correlations between scores on the Metropolitan Readiness Test Level II, Form P and the Metropolitan Achievement Tests range from .54 to .73.

According to Ravitch (1985), The Metropolitan Readiness Tests are among the technically best measures available. This is the test that the Elementary School uses at the end of Kindergarten. They use this instrument to group students for First Grade.

#### Informal Teacher Ratings

The informal teacher ratings of October, 1989 required the teachers to make a list of the children they believed to be high risk in the probability of developing learning problems. The teachers were also required to make a list of the children whom they believed would be most capable of performing at the First Grade level. These ratings were based on observation of the child. The teachers were directed to specify their reasons for classifying a child as "at-risk" (i.e. "at-risk" due to academic problems, "at-risk" due to social/emotional problems, or "at-risk" for any reason).

These informal teacher ratings were taken from Ferinden, Jacobson, and Linden (1970). These authors, and Haring and Ridgway (1967) found that teacher observation can

predict with 80 percent accuracy which children will experience academic failure.

### Design of the Study

#### Subjects:

The subjects were 39 Kindergarten children selected from Kent Elementary School, Agassiz, B. C. There were 21 male and 18 female children in the sample. The subjects ranged in age from 4 years - 9 months to 5 years - 10 months.

### Research Procedures

#### Predictive Testing:

The following instruments were administered in October 1989:

1. The Brigance K & 1 Screen for Kindergarten and First Grade (Kindergarten screen) (Brigance, 1987)
2. Fluharty Preschool Speech & Language Screening Test (Flurharty, 1978)
3. Kaufman's Short Form of the McCarthy Scales (Kaufman, 1977)

The tests were individually administered and all children received the tests in the order indicated above. In addition, the two Kindergarten teachers made a list of

the children they believed to be high risk in the probability of developing learning problems and a list of the children whom they believed would be most capable of performing at the First Grade level. It should be noted that the teachers were not informed of any child's performance on any of the predictive measures.

#### Follow-up Testing:

In the Spring of 1990 (May), the children were tested with the following instruments:

1. The Brigance K & 1 Screen for Kindergarten and First Grade (First Grade Screen) (Brigance, 1987)
2. Metropolitan Readiness Test (Level II) (Nurss, 1976)

The Brigance K & 1 Screen was individually administered, whereas the Metropolitan Readiness Test (Level II) was administered to small groups of children. The tests were administered in the order indicated above.

This early exploratory study was of the predictive nature. The three measures given in October of 1989 served as predictor variables. The three measures given in the spring of 1990 served as the dependent variables. Correlation coefficients were computed to reveal the predictive validity of each screening test employed.

### Summary

This chapter has described the research procedures, methodology, and the subject sample. Chapter Four presents the findings and conclusions of the study. Implications for further research are also included in Chapter Four.

## Chapter Four

### Findings

#### Introduction

This chapter presents the findings of the study. The chapter begins with the test results for the predictive and follow-up testing, as well as the correlations between the predictive tests and the follow-up tests. Tables describing the findings are presented in the text. The second section of the chapter presents a discussion. The author's research questions and hypotheses are included in this section. The last two sections present conclusions and implications for further research.

#### Results

Mean scores and standard deviations for these follow-up measures have been calculated and are reported in Table 3.

Table 3

Means and standard deviations for the Brigance K & 1 Screen for First Grade and the Metropolitan Readiness Test area and composite scores:

BRIG 1		MRT AUD.		MRT VIS.		MRT LANG.		MRT QUANT.		MRT TOTAL	
M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
78	10	23	6	18	6	12	3	15	4	53	13

note: N = 39

Correlation coefficients were computed in order to establish the predictive validity of each of the screening measures employed. These correlation coefficients are displayed in Table 4. The purpose was to see how well age, teacher ratings, the McCarthy Scales of Children's Abilities Kaufman's Short Form, the Fluharty Preschool Speech and Language Screening Test and the Brigance K & 1 Screen for Kindergarten correlated with the Brigance K & 1 Screen for First Grade and the Metropolitan Readiness test area and composite scores.

Table 4

Correlations between the predictive tests and the follow-up tests:

Predictors	Tests					
	a	b	c	d	e	f
1	.190	.319*	.286	.414*	.429*	.380*
2	.498*	.543*	.429*	.448*	.770*	.550*
3	.492*	.483*	.410*	.459*	.626*	.509*
4	.100	.116	.218	.014	.023	.160
5	.527*	.554*	.399*	.545*	.578*	.562*

Notes:

All correlations reported for 4 are point biserial correlations

1 = Age

a = Brigance 1 Screen

2 = Teacher Ratings

b = MRT Auditory Skill  
Area

3 = McCarthy Scales

c = MRT Visual Perception  
Area

4 = Fluharty Speech/Lang. Screen

d = MRT Language Area

5 = Brigance K Screen

e = Quantitative Area

f = Pre-Reading Composite

\* Significant at the .05 level.

For a population of 40 students, a correlation greater than .312 was statistically significant at the .05 level (Glass & Hopkins, 1984, p. 156). Age correlated significantly with the Metropolitan Readiness Test Auditory Skill Area, Language Skill Area, Quantitative Skill Area, and the Pre-Reading Composite (.319, .414, .429, and .380 respectively). Age was not significantly correlated with the Brigance K & 1 Screen for First Grade or the Metropolitan Readiness Test Visual Perception Area scores. Teacher Ratings correlated significantly with all of the follow-up measures (.429 to .770). Kaufman's (1977) Short Form of the McCarthy Scales of Children's Abilities test scores also correlated significantly with all of the follow-up measures (.410 to .626). None of the point biserial correlations between the Fluharty Preschool Speech and Language Screening Test and the follow-up measures were statistically significant. All correlations between the Brigance K & 1 Screen for Kindergarten and follow-up measures were statistically significant at the .05 level. With the single exception of the Fluharty Preschool Speech and Language Screening Test, all of the predictive measures correlated highest with the Metropolitan Readiness Test Quantitative Skill Area scores (.429 to .770). The highest correlation obtained was between teacher ratings and the Metropolitan Readiness Test Quantitative Skill Area Scores.



In Table 5, the teacher's accuracy for predicting students "at-risk" for later experiencing learning difficulties can be examined. The criterion used for the identification of students experiencing learning difficulties was an "at-risk" classification on the Brigance K & 1 Screen for First Grade and at least one or more "Low" scores on the Metropolitan Readiness Tests. Of the 6 students identified as "at-risk" for later learning difficulties, 4 were accurately identified. Of the 33 students identified as "low-risk", 3 were false negatively identified; that meant that the teacher identified them as "low-risk", but later testing suggested that this prediction was incorrect (the student earned an "at-risk" classification and one or more "Low" scores on the Metropolitan Readiness Tests - see Table 5). The teachers correctly identified 91 percent of the "low-risk" population and 67 percent of the "at-risk" population.

Table 5

<u>Teacher Predictions</u>			
	Good BRIG. 1 & MRT Scores	Poor BRIG. 1 & MRT Scores	
Teacher LOW- Risk predicted students	(Valid Negatives) 30 (91%)	False Negatives 3 (9%)	N = 33
Teacher AT- Risk predicted students	False Positives 2 (33%)	(Valid Positives) 4 (67%)	N = 6
	N = 32	N = 7	N = 39
	Hits: 30 + 4 = 34 (87%)	Misses: 3 + 2 = 5 (13%)	

Notes: "At-risk" refers to any child that has difficulty coping with the academic demands of the regular Kindergarten classroom.  
 "Low-risk" refers to any child that is capable of coping with the academic demands of the regular Kindergarten classroom.

In Table 6, the Brigance K & 1 Screen for Kindergarten's accuracy for predicting students "at-risk" for later failure can be examined. The criterion used for the identification of students experiencing learning difficulties was Brigance K & 1 Screen for First Grade "at-risk" classifications and one or more "Low" scores on the Metropolitan Readiness Tests. Of the 8 students classified as "Borderline" or "At-Risk" for later school failure, 5 were correctly identified. Of the 31 students identified as

no-risk, 3 were false negatively identified; that meant that the Brigance K & 1 Screen for Kindergarten identified them as no risk, but later testing suggested that this prediction was incorrect (the student earned an "at-risk" classification on the Brigance K & 1 Screen for First Grade, and at least two or more "Low" scores on the Metropolitan Readiness Tests - See Table 6). The Brigance K & 1 Screen for Kindergarten correctly identified 90 percent of the no-risk population and 62.5 percent of the "at-risk" population.

Table 6

<u>Brigance K Screen Predictions</u>			
	Good Brig. 1 & MRT Scores	Poor Brig 1 & MRT Scores	
BRIG. K NO- Risk predicted students	(Valid Negatives) 28 (90%)	False Negatives 3 (10%)	N = 31
BRIG. K AT- Risk predicted students	False Positives 3 (37.5%)	(Valid Positives) 5 (62.5%)	N = 8
	N = 31	N = 8	N = 39
	Hits: 28 + 5 = 33 (85%)	Misses: 3 + 3 = 6 (15%)	

## Discussion

### Discussion Regarding Questions:

The following research questions were considered in this study:

1. Which measure or combination of measures will most accurately predict success in Kindergarten?
2. Does the Brigance K & 1 Screen for Kindergarten (Brigance, 1987) accurately predict achievement near the end of Kindergarten, as determined by the Metropolitan Readiness Test (Nurss, 1976) and the Brigance K & 1 Screen for First Grade?
3. Does the Fluharty Preschool Speech and Language Screening Test accurately predict academic achievement near the end of Kindergarten, as determined by the Metropolitan Readiness Test and the Brigance K & 1 Screen for First Grade?
4. Does Kaufman's Short Form of the McCarthy Scales of Children's Abilities accurately predict academic achievement near the end of Kindergarten, as determined by the Metropolitan Readiness Test and the Brigance K & 1 Screen for First Grade?

5. Do informal teacher ratings accurately identify children "at-risk" for learning difficulties?

\*\* For the purposes of the present study, "near the end of Kindergarten" refers to May of 1990.

Question 1 asked which measure or combination of measures will most accurately predict success in Kindergarten.

The measure which most accurately predicted success in Kindergarten was Kaufman's Short Form of the McCarthy Scales of Children's Abilities. The General Cognitive Index Scores from this instrument correlated with the Brigance K & 1 Screen for First Grade scores and the Metropolitan Readiness Test scores at low to substantial levels (Garrett, H.E., 1958, p. 176). The correlations range from .410 to .626. The Brigance K & 1 Screen for Kindergarten composite raw scores also correlated with the Brigance K & 1 Screen for First Grade scores and the Metropolitan Readiness Test scores at low to substantial levels (Garrett, H.E., 1958). These correlations ranged from .399 to .578. The Brigance K & 1 Screen for Kindergarten's accuracy for predicting students "at-risk" for later failure was also examined. The Brigance K & 1 Screen for Kindergarten correctly identified 90 percent of the no-risk population and 62.5 percent of the "at-risk" population. For further reference, see Table 6.

The measures which most accurately predicted success in Kindergarten were Kaufman's Short Form of the McCarthy Scales of Children's Abilities and the Brigance K & 1 Screen for Kindergarten.

Question 2 asked, does the Brigance K & 1 Screen for Kindergarten accurately predict achievement near the end of Kindergarten, as determined by the Metropolitan Readiness Test and the Brigance K & 1 Screen for First Grade.

The Brigance K & 1 Screen for Kindergarten composite raw scores correlated with the Brigance K & 1 Screen for First Grade scores and the Metropolitan Readiness Test scores at low to substantial levels (.399 to .578). The highest correlation obtained was between the Brigance K & 1 Screen for Kindergarten and the Quantitative Area of the Metropolitan Readiness Test. The Brigance K & 1 Screen for Kindergarten composite raw scores correlated significantly with the Brigance K & 1 Screen for First Grade scores (.527). In addition, the Brigance K & 1 Screen for Kindergarten correctly identified 90 percent of the no-risk population and 62.5 percent of the at-risk population. For further reference, see Table 6. The results show that the Brigance K & 1 Screen for Kindergarten accurately predicted academic achievement near the end of Kindergarten, as determined by the Metropolitan Readiness Test and the Brigance K & 1 Screen for First Grade.

Question 3 asked, does the Fluharty Preschool Speech and Language Screening Test accurately predict academic achievement near the end of Kindergarten, as determined by the Metropolitan Readiness Test and the Brigance K & 1 Screen for First Grade.

The point biserial correlations between the Fluharty Preschool speech and Language Screening Test and the follow-up measures were not statistically significant (.014 to .218). Therefore, the Fluharty Preschool Speech and Language Screening Test did not accurately predict academic achievement in Kindergarten.

Question 4 asked, does Kaufman's Short Form of the McCarthy Scales of Children's Abilities accurately predict academic achievement near the end of Kindergarten, as determined by the Metropolitan Readiness Test and the Brigance K & 1 Screen for First Grade.

The General Cognitive Index scores from Kaufman's Short Form of the McCarthy Scales of Children's Abilities correlated with the Brigance K & 1 Screen for First Grade scores and the Metropolitan Readiness Test scores at low to substantial levels (.412 to .626).

The highest correlation obtained was between Kaufman's Short Form of the McCarthy Scales of Children's Abilities General Cognitive Index Scores and the Quantitative Area of the Metropolitan Readiness Test. The results show that Kaufman's Short Form of the McCarthy Scales of Children's Abilities accurately predicted academic achievement near the end of Kindergarten, as determined by the Metropolitan Readiness Test and the Brigance, K & 1 Screen for First Grade.

Question 5 asked, do informal teacher ratings accurately identify children "at-risk" for learning difficulties.

The informal teacher ratings required the Kindergarten teachers to make a list of the children that they believed were high risk in the probability of developing learning problems. The teachers were also required to make a list of the children that they believed would be most capable of performing at a first-grade level. These ratings were based on observation of the child. The informal teacher ratings were taken from Ferinden, Jacobson, and Linden (1970). These authors, and Haring and Ridgway (1967) found that teacher observation can predict with 80 percent accuracy which children will experience academic failure. Informal teacher ratings correlated significantly with the Brigance K & 1 Screen for First Grade scores and the Metropolitan



Readiness Test scores (.429 to .770). In addition, teachers correctly identified 91 percent of the "low-risk" population and 67 percent of the "at-risk" population. For further reference, see Table 5. The results indicate that teacher ratings accurately identified "at-risk" children for learning difficulties.

#### Discussion Regarding Hypotheses

The following hypotheses were considered in this study:

1. The Brigance K & 1 Screen for Kindergarten will accurately predict academic achievement near the end of Kindergarten, as measured by the Metropolitan Readiness Test and the Brigance K & 1 Screen for First Grade.
2. The Fluharty Preschool Speech and Language Screening Test will accurately predict academic achievement near the end of Kindergarten, as measured by the Metropolitan Readiness Test and the Brigance K & 1 Screen for First Grade.
3. Kaufman's Short Form of the McCarthy Scales of Children's Abilities will accurately predict academic achievement near the end for Kindergarten, as measured by the Metropolitan Readiness Test and the Brigance K & 1 Screen for First Grade.

4. Informal teacher ratings will accurately identify children "at-risk" for learning difficulties.

The Brigance K & 1 Screen (Brigance, 1982) composite raw scores correlated with the Brigance K & 1 Screen for First Grade scores and the Metropolitan Readiness Test at low to substantial levels (.399 to .578); therefore, this supports the first hypothesis that the Brigance K & 1 Screen for Kindergarten did have predictive validity with later academic achievement. The Brigance K & 1 Screen for Kindergarten also correctly identified 90 percent of the no-risk population and 62.5 percent of the "at-risk" population.

The point biserial correlations between the Fluharty Preschool Speech and Language Screening Test and the follow-up measures were not statistically significant (.014 to .218). These results are not supportive of the predictive validity of the Fluharty Preschool Speech and Language Screening Test, and therefore, do not give support for the second hypothesis. It is not this author's opinion that the Fluharty Preschool Speech and Language Screening Test served as a poor predictor, but rather that the Language Area of the Metropolitan Readiness Test served as a poor criterion measure. The Fluharty Preschool Speech and Language Screening Test's predictive validity would probably have been much greater if a widely used language test [i.e. the

Test of Language Development (Newcomer & Hammill, 1977)] had served as the criterion measure.

Kaufman's Short Form of the McCarthy Scales of Children's Abilities General Cognitive Index scores correlated with the Brigance K & 1 Screen for First Grade scores and the Metropolitan Readiness Test scores at low to substantial levels (.412 to .626); therefore, this supports the third hypothesis that Kaufman's Short Form of the McCarthy Scales of Children's Abilities did have predictive validity with later academic achievement.

Teacher ratings correlated significantly with the Brigance K & 1 Screen for First Grade scores and the Metropolitan Readiness Test scores (.429 to .770). These results give moderate support for the fourth hypothesis and the predictive validity of teacher ratings. In addition, teachers correctly identified 91 percent of the "low-risk" population and 67 percent of the "at-risk" population.

### General Discussion

The positive relationships between the Brigance K & 1 Screen for Kindergarten and First Grade, Kaufman's Short Form of the McCarthy Scales of Children's Abilities, informal teacher ratings and Kindergarten achievement demonstrates that the use of these measures can be valuable in a screening program. These particular screening measures

were moderate predictors of Kindergarten achievement. The Brigance K & 1 Screen for Kindergarten and First Grade and Kaufman's Short Form predicted Kindergarten achievement about equally well. The Kindergarten teachers accurately predicted 91 percent of the "low-risk" population and 67 percent of the "at-risk" population. Ferinden et. al., (1970) and Haring and Ridgeway (1967) found that teacher observation can predict with 80 percent accuracy which children will experience academic failure. A combination of screening instruments and teacher ratings would likely improve the screening process. The Fluharty Preschool Speech and Language Screening Test scores did not correlate significantly with either of the follow up measures. The research indicates that performance on language measures is predictive of performance in school (Jansky & deHirsch, 1972; Zeitlin, 1976; Satz & Friel, 1978). The results of the present study contradict these researcher's findings. It is not this author's opinion that the Fluharty Preschool Speech and Language Screening Test served as a poor predictor but rather that the Language Area of the Metropolitan Readiness Test served as a poor criterion measure. The predictive validity of the Fluharty Preschool Speech and Language Screening Test would probably have been much greater if a widely used language test (i.e. Test of Language Development) had served as the criterion measure.

### Recommendations for the Elementary School

The author's suggestions for the Elementary School that participated in this study include:

- utilizing informal teacher ratings and/or a teacher rating scale (i.e. Kindergarten Teacher Rating Scale)
- utilizing the Brigance K & 1 Screen for Kindergarten and First Grade during the fall of the Kindergarten year (to be administered by school personnel)
- utilizing the Metropolitan Readiness Test at the end of the Kindergarten year (to be administered by school personnel)
- utilizing other screening and criterion measures such as Kaufman's Short Form, the Florida Kindergarten Screening Battery, the Fluharty Preschool Speech and Language Screening Test, the Test of Language Development and the Metropolitan Achievement Test (to be administered by a district school psychologist).

### Summary and Conclusions

In summary, the Brigance K & 1 Screen for Kindergarten, Kaufman's Short Form of the McCarthy Scales of Children's Abilities, and informal teacher ratings, correlated with the follow-up measures at low to substantial levels. The

highest correlations obtained ( $r = .578, .626, .770$ ) were between these three measures and the Quantitative Area of the Metropolitan Readiness Test. No support was provided for the predictive validity of the Fluharty Preschool Speech and Language Screening Test.

In conclusion, some support was provided for the predictive validity of the Brigance K & 1 Screen for Kindergarten, Kaufman's Short Form of the McCarthy Scales of Children's Abilities, and informal teacher ratings. Although many of the correlations obtained were statistically significant, most correlations were relatively low. The results of this study would have been more meaningful if the sample had been greater than 39 subjects.

#### Implications for Further Research

Implications for future research on the predictive validity of Kindergarten screening batteries include the following:

1. Continued research on all Kindergarten screening batteries will provide valuable information on the variables that best predict later achievement.  
(Exactly what are the essential elements of an

effective screening battery?, What are the most valid instruments to use?)

2. Further research examining the differences of one comprehensive screening battery on different SES groups, different geographical locations, and independent versus public schools could assist educators in selecting a Kindergarten screening battery to suit their specific needs.
3. Longitudinal studies over several years could provide educators with more information on the variables that affect different grade and age groups.
4. Suggestions for replication of this study include:
  - increasing the sample size (N = 100)
  - utilizing a widely used language test (i.e. the Test of Language Development) as a criterion measure
  - correlating the subtest scores of the Brigance K & 1 Screen for Kindergarten and First Grade with the Area Scores of the Metropolitan Readiness Test
  - and utilizing a teacher rating scale (i.e. the Kindergarten Teacher Rating Scale) during the fall of the Kindergarten.

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## Appendix

### Informal Teacher Ratings

The informal teacher ratings of October, 1989 required the teachers to make a list of the children they believed to be high risk in the probability of developing learning problems. The teachers were also required to make a list of the children whom they believed would be most capable of performing at the First Grade level. These ratings were based on observation of the child. The teachers were directed to specify their reasons for classifying a child as "at-risk" (i.e. "at-risk" due to academic problems, "at-risk" due to social/emotional problems, or "at-risk" for any reason).