To the Graduate Council:

I am submitting herewith a dissertation written by Alan Dirk Hightower entitled "The Predictive Validity of a Multivariate Kindergarten Screening Battery Using Child and Environmental Measures." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Psychology.

Raymond P. Lorion, Major Professor

We have read this dissertation
and recommend its acceptance:

Accepted for the Council:

Vice Chancellor
Graduate Studies and Research

THE PREDICTIVE VALIDITY OF A MULTIVARIATE KINDERGARTEN SCREENING BATTERY USING CHILD AND ENVIRONMENTAL MEASURES

A Dissertation

Presented for the

Doctor of Philosophy

Degree

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Alan Dirk Hightower

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DEDICATION

I dedicate this to my extended family--for those who have been, for those who are, and for those who will be.

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ABSTRACT

The purpose of this study was to determine the efficacy and predictive validity of a multivariate kindergarten screening battery in predicting multiple end-of-year success criteria. The screening battery, which included 17 individual measures of student performance and 13 measures of classroom, school, and community environment, was administered in two phases to nine kindergarten classrooms and 209 students. In phase one eight subtests from the McCarthy Scales of Children's Abilities and two subtests of the Developmental Language Program were individually administered by trained paraprofessionals, a developmental review and the Child Behavior Form (CBF)--a social/adaptive rating form--were completed by parents, and the CBF was completed by the teacher. In phase two a peer rating sociometric was individually administered to kindergarten children; perceptions of the school environment were obtained from kindergarten parents and teachers and from students, parents, and teachers of second, third, and fifth grades; and the kindergarten classroom environments were observed. In the third phase end-of-year measures including teacher ratings, parent ratings, achievement test results, and the kindergarten report card were gathered.

The child and environmental variables were analyzed using MANOVA, Pearson correlations, and discriminant analyses. The results indicated different variables predicted different areas of school functioning. A combination of child and environmental variables had the greatest classification success (75% to 84% correct) after Bayesian correction.

The implications of these findings and the methodological limitations of the study were discussed.

TABLE OF CONTENTS

SECTION		PAGE
I.	INTRODUCTION	1
	Screening Issues and Research	5
	Approaches to Screening	7
	Teacher Ratings	9
	Psychometric Considerations of Screening Measures	12
	Screening Test Criteria	17
	Environmental Assessment in Educational Settings	21
	Summary	43
II.	METHOD	46
	Subjects and Setting	46
	Measures	48
	Child Measures	49
	Environment Measures	53
	Parents	53
	Teacher	55
	Parent/Teacher Measures	57
	Student Measures	57
	Observational Measures	58
	End-of-Year Measures	59
	Procedures	61
	Missing Data	66
III.	RESULTS	68
	Descriptive Analyses	68
	Reliability Estimates	72
	Child Environmental and End-of-Year Variables Relationships Within Schools and Classes	74
	Correlations Among Variables	94
	Correlations Between Child and Environmental Variables with End-of-Year Measures: Predictive Validity Indices	108
	Discriminant Analysis	118
	Child Variables	123
	Environment Variables	127
	Child and Environment Variables	132
	Classification Results	136
IV.	DISCUSSION	143
LIST OF REFERENCES		159

SECTION PAGE

APPENDIXES. 175

A. UNPUBLISHED INSTRUMENTS 176
B. LETTERS AND CONSENT FORMS 199
C. FREQUENCY OF RETURN OF PARENT OPINION INVENTORY BY SCHOOL AND GRADE. 205
D. SPEARMAN CORRELATION COEFFICIENTS FOR REPORT CARD ITEMS BETWEEN GRADING PERIOD 4 AND GRADING PERIOD 6 FOR CLASS B2. 207

VITA. 209

LIST OF TABLES

TABLE		PAGE
1.	Frequency of Student's Demographic Characteristics and Teachers' Experience Levels	47
2.	Sample Size, Means, Standard Deviations, and Range for Child Variables	69
3.	Sample Size, Means, Standard Deviations and Range for Environmental Variables	70
4.	Sample Size, Means, Standard Deviations and Range for End-of-Year Measures	71
5.	Internal Reliability Estimates for Child Variables	73
6.	Internal Reliability for Environmental Variables and Scales.	75
7.	Interobserver Reliability Coefficients Computed with Cronbacks Alpha for the Early Childhood Environment Rating Scales' Items and Scales.	76
8.	Multiple Analysis of Variance for Child Variables as Dependent Measures	78
9.	Multiple Analyses of Variance for Environmental Variables as Dependent Measures.	80
10.	Multiple Analysis of Variance for the School Problem Area Survey.	85
11.	Multiple Analyses of Variance for the Teacher Opinion Inventory.	87
12.	Multiple Analyses of Variance for the MY Class Inventory	89
13.	Multiple Analyses of Variance with End-of-Year Measures as Dependent Variables	91
14.	Pearson Correlations Among Child Variables	95
15.	Pearson Correlations Among Environmental Variables	98
16.	Pearson Correlations Among End-of-Year Measures.	101
17.	Pearson Correlations Between Child and Environmental Variables.	104

TABLE PAGE

18. Pearson Correlations Between Child and Environmental Variables with End of Year Criteria. 109

19. Frequency of Significant Correlations Between Child Variables and 16 End of Year Measures. 110

20. Frequency of Significant Correlations Between Environment Variables and 16 End of Year Measures. 111

21. Prior Probabilities for Functioning Areas by Functioning Levels 121

22. Group Centroids and Significance Tests for the Equality of Group Centroids by Functioning Area for Models Using Child Variables. 124

23. Standardized Canonical Discriminant Function Coefficients for Functioning Area Using Child Variables 125

24. Group Centroids and Significance Tests for the Equality of Group Centroids by Functioning Area for Models Using Environmental Variables. 128

25. Standardized Canonical Discriminant Function Coefficients for Functioning Area Using Environmental Variables 130

26. Group Centroids and Significance Tests for the Equality of Group Centroids by Functioning Area for Models Using Child and Environmental Variables. 133

27. Standardized Canonical Discriminant Function Coefficients for Functioning Area Using Child and Environmental Variables. 134

28. Classification Results for Academic Functioning with Bayesian Correction for Unequal Prior Probabilities. . . . 137

29. Classification Results for Social Functioning with Bayesian Correction for Unequal Prior Probabilities. . . . 138

30. Classification Results for Adaptive Functioning with Bayesian Correction for Unequal Prior Probabilities. . . . 139

31. Classification Results for Overall Functioning with Bayesian Correction for Unequal Prior Probabilities. . . . 141

I. INTRODUCTION

The purpose of this study was to investigate the efficacy of a multivariate kindergarten screening battery in predicting end-of-year kindergarten performance. In addition to individual measures of student performance, the screening battery included measures of the school and classroom environment. Multiple end-of-year criteria were assessed as determinants of performance. The differential and combined contributions of individual and environmental data in predicting end-of-year performance was also examined.

Many believe kindergarten screening strategies, if psychometrically sound, should be part of an ongoing process to identify and implement supplemental services for children with special needs, and a component of educational programs designed to maximize all children's academic potential (Bower, 1977; Gallagher & Bradley, 1972; Keogh & Becker, 1973; Lidz, 1977; Mercer, Algozzine & Trifiletti, 1979; Reynolds, 1979; Tjossen, 1976). It has been suggested that minimal components of screening strategies include: (1) multimethod multivariate individual developmental and psychosocial measures (Children's Defense Fund, 1978; de Hirsch, Jansky, & Langford, 1966; Keogh, 1977; Lidz, 1977; Mercer et al., 1979; Satz & Fletcher, 1979); (2) assessment of the classroom environment (Abrahamson & Bell, 1979; Adelman, 1970; Bloom, 1976; Bradley & Caldwell, 1978; Keogh, 1977; Mercer & Trifiletti, 1977; Rickel, 1977; Silver, 1971; Telegdy, 1974; Wilborn & Smith, 1974; Wonderly, Kupfersmid, Monkman, Deak, & Rosenberg, 1979; Zigler & Seitz, 1980), (3) information relevant to curriculum selection and instructional

strategies (Bower, 1977, 1978; Lesiak & Wait, 1974; Lidz, 1977; Keogh, 1977; Keogh & Becker, 1973; Novack, Bonaventura, & Merenda, 1977), and (4) individual strengths (American Orthopsychiatric Association, 1979; Children's Defense Fund, 1978; Keogh & Becker, 1973; Lewis, 1980; Ziegler & Seitz, 1980).

As noted, researchers have repeatedly proposed including environmental information within kindergarten screening programs. Few researchers, however, actually measured the environment. Fewer still have assessed the kindergarten environment and none have done so with multiple measures. Proposed arguments and empirical results support the inclusion of educationally relevant, and psychometrically sound environmental and child variables that measure strengths and weaknesses as part of a kindergarten screening battery. The child and environmental kindergarten variables that might assist in predicting school performance need to be determined. This study focused on that need.

One of the most compelling arguments for early academic screening is the recognition that young children are more responsive to interventions than are older children (Bloom, 1964; Schiffman & Clemmens, 1966; Muehl & Forell, 1972). Reviewing a number of longitudinal studies, Bloom (1964) suggested that human development is most significantly influenced during periods of maximum growth. Bloom hypothesized that by age eight a child has attained 80% of adult intellectual capacity. Schiffman & Clemmens (1966), in their review of survey research, argued that identification and remediation of specific reading disabilities should begin as early as possible. They reported that if children with reading difficulties are identified in the early

primary grades and taught appropriately, 82% of them can function at grade level within two years. By contrast, students who were not identified until fifth grade, a typical occurrence, had at best a 15% chance of ever reaching grade level. Bloom (1976) similarly suggested that if all children received early and appropriate instruction, nearly 90% have the potential to master current academic curricula. Support for this position is provided by Muehl and Forell (1973) who reported a five-year follow-up study of 43 readers diagnosed as disabled. Diagnosis occurred at the fifth grade and follow-up at the tenth grade. A total of two students (4%) read at or above grade level in high school. When Muehl and Forell (1973) assessed their subjects by chronological age, the youngest subjects were better readers than the oldest subjects. These findings support Schiffman and Clemmens (1966) conclusions that identification and remediation for most children above fifth grade has minimal effect, and the earlier remedial efforts begin, the better.

While early identification with remediation has both theoretical and empirical support, when to intervene remains unclear. Some reviews have suggested that for interventions to be most effective they should occur during the first three years of life (Caldwell, 1970; Lipton, 1976; Mori & Olive, 1980; Tjossem, 1976b). Others, however, have suggested screening can occur later in life. For example, Keogh and Becker (1973), Bower (1978), and the American Orthopsychiatric Association (1978) argue for screening skills which are developmentally relevant and maturationally possible. For example, it makes little

sense to screen for reading disabilities in kindergarten, when reading is not taught until the end of first grade. In fact, Keogh (1977) has found no consistent relationship between early academic screening in kindergarten and later academic performance. She attributed this finding to the reactivity of early development. Bower (1977) suggested comprehensive screening should occur at transition points such as school entry, before reading instructions, etc., when new behaviors are expected. Mercer et al. (1979), in their review of screening studies, supported this view. In fact, they suggested screening should focus on different skills and abilities at different times throughout the year. For example, they recommended screening for sensory, motoric, and social dysfunction during the first half of kindergarten and for academic deficits (e.g., quantitative, verbal, and psychomotor abilities) during the second half.

Premature screening and interventions are not without their risks. Gersten, Langner, and Simcha-Fagan (1979), using a third grade sample, reported the negative consequence of intervening. Children who received a remedial intervention actually performed more poorly on outcome measures than those who received no treatment.

Screening and interventions must not only be timed with a child's natural resilience in overcoming early deficits (Kagan & Klein, 1973; Samaroff & Chandler, 1975), but also coordinated with pragmatic reality. It appears that initial comprehensive screening should logically start in kindergarten and continue through the early primary grade years. Present federal and state laws support screening at school entry. The Education for All Handicapped Children Act

(P. L. 94-142) requires schools to locate and identify handicapped children. Therefore, the degree to which screening can or must include young children is frequently determined by the mandatory school entry age in any particular state. Pragmatically, school entry is a logical period for initial screening procedures.

Screening at school entry should not be the one and only systematic review of a child's functioning. Keogh (1977) noted that children change throughout the school year. In fact, almost all those involved with the screening have suggested screening should not be construed as a one-step event, but as an ongoing process which must be continued and updated throughout the child's early school years (Bower, 1978; Bronfenbrenner, 1974; Caldwell, 1974; Keogh, 1977; Keogh & Becker, 1973).

Two sets of studies are presented in the remainder of this chapter. The first set highlights past screening issues related to the design and evaluation of screening strategies. The second details environmental assessment within school settings.

Screening Issues and Research

A comprehensive review of early academic screening includes: (1) its historical precursors; (2) issues behind early identification: (a) developmental areas suggested for screening, (b) the effects of labeling, (c) psychometric considerations regarding screening measures, (d) specific properties of available screening instruments, (e) outcome criteria frequently used to assess screening validity, and (f) the use of teacher rating instruments for screening adaption. (3) A list of recommendations summarizing the above is presented elsewhere (Hightower, 1981). Highlights of that review are presented below.

Historically, early educational screening has been embedded within the development of and interest in early childhood education and the education of handicapped children (see American Orthopsychiatric Association, 1978; Bronfenbrenner, 1974; Caldwell, 1970; Hunt, 1975; Kirk, 1977; Mori & Olive, 1980; Morrison, 1980; Tjossen, 1976a). During the past two decades the writings of Hunt (1961) and Bloom (1964) have represented important stimulants for the continued growth in interest in early education. For example, Hunt (1961) argued that the upper limit of intellectual functioning is genotypically established at birth, but that its phenotypic expression or final development is primarily influenced by environment and experience. This position represented one of the first open challenges to the view of intelligence as a fixed human trait.

Bloom (1964) supported this position. Based on a review of longitudinal studies, Bloom (1964) concluded that external factors or the environment significantly influence the course of human development. He linked human characteristics and their subsequent development to early experience.

As the environment became more established and accepted as a potential influence, interest in the early identification of handicapping conditions also increased. The public health sector developed screening methods for infectious diseases and chronic physical conditions. Borrowing from public health, preventative health care expanded with the 1967 amendment to the Social Security Act which made Early Periodic Screening Diagnosis and Treatment available to all children receiving Medicaid. Later compensatory educational programs such as

Head Start and Title I required the identification of special needs children. And most recently P. L. 94-142, discussed earlier, mandated "Child Find" procedures. The goals espoused by proponents of early childhood screening appear at first glance to be beyond reproach. Who, after all, would argue against providing each child an opportunity to maximize his/her potential? A close examination of related issues, however, is necessary to bring screening into perspective.

Four issues relevant to this study merit closer examination. They include: (1) approaches to screening, (2) the use of teacher ratings, (3) psychometric considerations, and (4) outcome criteria used to assess validity.

Approaches to Screening

At present there is no generally agreed upon definition of what focus educational screening should take or what set of procedures should be followed (American Orthopsychiatric Association, 1978; Kulberg & Gershman, 1973). Some of the resulting ambiguity reflects the definitional looseness of target disorders as there are no clear definitions of a learning disability, emotional disturbance, or mild to moderate mental retardation (Hallahan & Kauffman, 1977). In part, this reflects the fact that behaviors attributed to academic failure are found to overlap among the handicapped and normal children (Boucher & Deno, 1979; Hallahan & Kauffman, 1976, 1977; Keogh, Tehir, & Windeguth-Behn, 1974; McCarthy & Paraskevopoulos, 1969). In part, it also reflects the fact, as Mowder (1980) points out, that all children at some point in development show various signs associated with "disturbance."

Frequently the tolerance of others or the current operational definition of a disorder determines if a child is seen as having difficulties (Mowder, 1980; Reschly, 1981). A second definitional problem is related to developmental maturity. Thus, normal developmental changes may be misclassified as abnormal (Bower, 1977; Keogh & Becker, 1973; Mercer et al., 1979).

As seen by these definitional difficulties, most reasons for dysfunction have been attributed to children. Screening emphasis has followed this pattern. The traditional screening approach has been to screen children for developmental risk factors. A relatively minor emphasis has been environmental, i.e., external behavioral influences.

Within the traditional model, educational screening has become synonymous with the assessment of sensory, cognitive/intellectual, communicative/lingual, social/adaptive, affective/emotional, and motoric functioning. Typically, children's deficits are considered discrete and able to be isolated and treated. For example, if a child cannot recognize letters he/she may be diagnosed as blind and sent to a school for the blind, possibly as mentally retarded and put in extended (3 to 6 hours per day) special education classes, or maybe learning disabled and given sand to reproduce letters with, etc. Often, however, children with the disabilities are considered deviant (Newcomer, 1977). It is recommended that those who ascribe to any part of the traditional model use multiple psychometrically sound screening instruments (Children's Defense Fund, 1978; American Psychological Association, 1970;

American Orthopsychiatric Association, 1978; Task Panel on Learning Failure and Unused Learning Potential, 1978).

An alternative perspective, environmentally based screening, is less well developed. No secondary prevention screening study available has used environmental variables such as: teacher's perspectives of the class, parent-teacher differences regarding the school, student perceptions of the environments, or classroom climate observations. As will be discussed in the last half of this chapter, few studies have assessed kindergarten environments in any manner. However, environmental variables, or variables external to children, recommended for screening include: SES (Abrahamson & Bell, 1979; Bradley and Caldwell, 1978; Caldwell, 1970; Gibson, 1978; Gredler, 1978; Rickel, 1977; Telegdy, 1974); classroom characteristics including: procedures and materials (Adelman, 1970; Keogh, 1977) and structure of the classroom (e.g., open versus closed) (Abrahamson & Bell, 1979); life event history, such as parental divorce, deaths of significant others, sibling births, family relocations, etc. (Bradley & Caldwell, 1978; Hoffman, 1971; Silver, 1971; Mercer & Trifiletti, 1977; Wilborn and Smith, 1974); and school-community relationships (Keogh, 1977).

Teacher Ratings

Teacher ratings have been used to assess a wide array of student behaviors including: adaptive, emotional, and social behaviors (Cowen, Trost, Lorion, Dorr, Izzo, & Isaacson, 1975; Kirschenbaum, Marsh, & Deuoge, 1977; Lorion, Cowen, & Caldwell, 1975; Lorion, Barker, Cahill, Gallagher, Passons, & Kaufki, 1981; McCarthy & Pakaskeuopoulos,

1969), learning disabilities (Bryan & McGrady, 1972; Ferinden, Jacobson, & Linden, 1970; Feshback, Adelman, & Fuller, 1974; Haring & Ridgeway, 1967; Teledgey, 1975), and learning readiness (Keogh & Smith, 1970; Keogh et al., 1974; Kermoian, 1962; Kirk, 1966; Wallbrown, Wallbrown, & Engin, 1977), to name a few. These ratings as measures of emotional or behavioral difficulties, and overall kindergarten readiness, will be surveyed at this point.

Wickman (1928) initially investigated teacher ratings of students. He compared 511 teacher ratings with 30 mental hygienists on the seriousness of 50 behavioral traits of children. He reported that teachers were better predictors of classroom and school success than hygienists.

In a review of screening procedures starting with Wickman's study, White and Harris (1961) concluded that teacher rating scales were the primary measure of emotional disturbance available. Spivack and Swift (1973), in their critical review of teacher-administered classroom behavior rating scales, reported the following conclusions: (1) teacher rating scales seemed strongly influenced by mental health interests as the scales reviewed frequently included categories such as: aggressive-disobedient , socially withdrawn or timid, and worried or neurotic behaviors; (2) three of the nineteen scales surveyed adequately covered classroom behavior dimensions and reported standardization data; (3) potential users of various rating scales need to examine each instrument carefully before using it; (4) teacher ratings appear to discriminate between various criterion groups with relative stability

over time; (5) teachers tend to rate girls more accurately on positive behaviors than boys; (6) behavior profiles represent a potentially new dimension to understanding classroom behavior; and (7) frequently there are significant teacher-teacher ratings disagreement.

In order to assess the relationships between teacher ratings and actual behavior (recorded through an observational strategy), Bolstod and Johnson (1977) asked 10 teachers to identify the two students (boy-girl pairs) in their class who were: (1) best behaved, (2) most typical, and (3) least well behaved for a total of six children per class. Two teacher rating scales (Becker, 1960; Walker, 1969) were compared with 200 minutes of behavioral observation obtained from a five second instantaneous behavioral observation system. After noting differences in SES and reading achievement, the authors concluded: (1) the least well behaved had significantly lower SES and reading achievement and (2) that the independent behavioral observation scores corroborated the teacher ratings. Bolstad and Johnson (1977) supported Spivack and Swift's (1973) conclusion that there are significant differences in the accuracy of rating. Some teachers are highly accurate, while others appear to be unable to judge student behavior (Bolstad & Johnson, 1977).

In sum, teacher ratings are an important source of information in developing kindergarten screening programs to assess emotional and learning problems and academic achievement. Most efficient and valid results from ratings appear to be acquired after teachers have been trained in observation skills and detailed use and abilities of the rating forms. Without such training rating biases related to the child such SES, age, sex, and race may appear. Moreover, the

recognition that raters tend to develop their own internal norms limits the use of such ratings unless rater consistency can be established.

Psychometric Considerations of Screening Measures

The nature or format of screening procedures varies in relation to their targeted focus. Individual and group tests make up the bulk of kindergarten screening programs. Such tests can be globally categorized as normative--i.e., those which compare a child's performance against a standardized group--and criterion, i.e., those which compare a child's performance against a rank ordered set of mastery skills. Since normative tests are the most widely used, the following section will discuss psychometric issues relevant to their use. As noted in reviews of published (Burros, 1978; Southworth, Burr, & Cox, 1981; Zeitlin, 1978) and unpublished (Johnson, 1976) screening measures, appropriate normative samples assessing performance in relation to demographic variables such as geographic region, SES, age, sex, race, and language are frequently not included in standardization data. The Children's Defense Fund (1978) considers age, sex, race, and SES as minimum standardization test criteria.

Reliability refers to the repeatability or consistency of results within the test itself, across similar forms of the test as well as across time. As with normative sampling, reliability data on most screening instruments is frequently lacking or inadequate (Burros, 1978; Southworth et al., 1981; Johnson, 1976; Zeitlin, 1978). Coleman (1978) and the Children's Defense Fund (1978) in their reviews of the

Early Periodic Screening Diagnosis and Treatment Program's developmental and mental health component concluded that there is no reliable screening tests. Similarly, Gallagher and Bradley (1972) and Keogh and Becker (1973) noted the reliability of most screening instruments has yet to be determined. Wendt (1978) suggested that poor reliability is associated with the rapid developmental changes which occur during the early school years. In order to assess this, Wendt recommended that age increments in the normative samples must be small and must respect critical developmental periods.

Before a screening instrument or battery is psychometrically acceptable, its validity must be established. Bower (1977), Flynn and Flynn (1977), Gallagher and Bradley (1972), Keogh and Becker (1973), Keogh (1977), and Mercer et al. (1979) noted the questionable predictive validity of many screening procedures (for a review of predictive validty of specific tests, see Mercer et al., 1979). Although some investigators have suggested predictive validity can be enhanced by using repeated multivariate measures (Satz, Taylor, Friel, & Fletcher, 1978) or by using criterion measures that are more contiguous with the developmental sequence (Hunt & Kirk, 1974; Keogh, 1977; Keogh & Becker, 1973; Wendt, 1978), others have suggested kindergarten screening batteries regardless of content cannot accurately predict more than 75% of failing students (Jansky, 1978).

Establishing a screening measure's predictive validity is one of the most complex and challenging issues in scale development (Gallagher & Bradley, 1972; Lewis, 1980; Mercer et al., 1979; Satz & Fletcher, 1979). A variety of strategies for assessing predictive validity

exist. For example, a frequently used procedure is to assess the correlation between the screening test or battery and a criterion variable obtained later. This method does not provide information about the accuracy of individual predictions, but does provide an index of instrument accuracy. A second strategy involves concurrent administration of the instrument to be validated with one having established predictive validity. As Mercer et al. (1979) observed, this practice is limited by the predictive validity of the criterion instrument and also provides little information relevant to individual placement decisions. The remaining types of predictive validity transformations are presented in Figure 1 and described below.

Reporting the percentage of correct classifications is another mode of presenting predictive validity. One method assumes the number of subjects classified to each category is equal to the prior probabilities of that category (see Figure 1, Type I). Without correction, percentage correct classification is usually spuriously high for screening results since the majority of children who performed successfully will continue to do so (Gallagher & Bradley, 1972; Lewis, 1980; Mercer et al., 1979; Satz & Fletcher, 1979). Therefore, these percentages should usually be corrected by prior probabilities or base rates (Meehl & Rosen, 1955). This method focuses on the probability of a valid positive or negative being correct, an application of Bayes' Theorem (Meehl & Rosen, 1955). For example, if failure rates (valid +, see Figure 1) for kindergarten students is 10% (a prior probability of .10), then passing rates are 90% (a prior probability of .90). By chance alone one would expect 1% of the kindergarten students who

DIAGNOSTIC PREDICTION
OF PERFORMANCE

ACTUAL PERFORMANCE		POOR	GOOD
	POOR	A VALID +	C FALSE +
	GOOD	B FALSE -	D VALID -

A + B + C + D = TOTAL

FORMULAS FOR VARIOUS
TYPES OF PREDICTIVE VALIDITY

I. % CORRECT CLASSIFICATION = $\frac{A + B}{A + B + C + D} \times 100$

II. % MISCLASSIFICATIONS

$$1 = \frac{C}{A + C} \times 100 \quad \text{and} \quad \frac{B}{B + D} \times 100$$

$$\text{or} \quad 2 = \frac{C}{C + D} \times 100 \quad \text{and} \quad \frac{B}{A + B} \times 100$$

III. % MISCLASSIFICATIONS (Gallager & Bradley, 1972)

$$= \frac{C}{A + C} \times 100 \quad \text{and} \quad \frac{B}{A + B} \times 100$$

IV. CORRECTION OF CLASSIFICATIONS WITH BAYE'S THEORM

$$p_1 = \frac{A}{A + C} \qquad p_2 = \frac{B}{B + D} \qquad q_1 = \frac{C}{A + C} \qquad q_2 = \frac{D}{B + D}$$

$p_1 + q_1 = 1.0$ (actual poor performance)

$q_1 + q_2 = 1.0$ (actual good performance)

P = Base rate of poor performance

Q = Base rate of good performance

$P + Q = 1.0$

po = Probability that a child assigned to poor performance is actually a poor performer

$$po = \frac{(P)\ (p_1)}{(P)(p_1) + (Q)(p_2)}$$

If $\frac{Q}{P} < \frac{p_1}{p_2}$, then the prediction is greater than chance and will be classified as a poor performer.

FIGURE 1. STRATEGIES FOR ASSESSING PREDICTIVE VALIDITY USING THE PREDICTION PERFORMANCE MATRIX.

failed (i.e. (prior probability)^2 or ($.10^2$)) and 81% ($(.90)^2$) of those who passed to be correctly classified. This means by chance alone 82% will be correctly classified and 18% will be incorrectly classified (i.e., 9% false + ((.10)(.90)); and 9% false - ((.90)(.10))). By classifying a student after considering prior probabilities (see Figure 1, Type IV), it can be seen that a high degree of accuracy is acquired at the expense of high false negative or false positive results (see Figure 1). For a more detailed explanation the reader is referred to Meehl and Rosen (1955), Mercer et al. (1979), and Satz and Fletcher (1979).

An alternative strategy is to determine percent misclassifications. This index can be obtained in two ways. The "performance criterion" is computed as the number of false negatives divided by those who performed poorly and false positives divided by those who performed well. The "prediction result" is computed by dividing false negatives by those predicted to do well and dividing false positives by those predicted to do poorly. These percentages can then be used. Typically, each method gives different results (see Figure 1, Formulas II and III).

Gallagher and Bradley (1972) proposed a composite method of reporting the predictive validity of misclassifications. They suggested taking the number of false positives as a percentage of those predicted to do poorly and false negatives as a percentage of those who performed poorly, as well as a visual inspection of the prediction-performance comparison matrix. This method can be helpful in determining cutoff points by minimizing the error rates and maximizing the accuracy rates

as a function of manipulating the cutoff score (Gallagher & Bradley, 1972) (see Figure 1, Formula III).

It seems apparent that no one approach to the measurement of predictive validity for screening measures should be accepted as conclusive evidence of predictive validity (Satz & Fletcher, 1979). Each of the methods reviewed above has its unique strengths and weaknesses. Some combination of these approaches may best represent an accurate estimate of predictive validity.

Screening Test Criteria

Attention will now be focused on the assessment of future achievement. The predictive validity of any screening test is dependent upon the criterion to which the screening results are compared. The following reviews what criterion have been used with screening tests.

A classic study, Predicting Reading Failure, by de Hirsh et al. (1966), validated their battery of 37 variables with the Gates Sentence and Paragraph and the Gray Oral Reading Tests at the end of first grade and a writing test to test for dysgraphic, the Gates Advanced Primary and Gray Oral Reading tests to test for reading skills, and the spelling subtest from the Metropolitan Achievement Test Primary II Battery during the second grade. The authors used 16 pages to detail the screening variables, one page to reference the criterion variables, and never reported any normative information regarding the criterion measures. Without knowing the validity of the criterion, the validity of the battery is unknown.

Other studies have made assumptions regarding criterion tests that may be questionable. Teledgy (1975) and Colligan (1976) used the Wide Range Achievement Test (WRAT) as a prediction criteria for reading achievement. Few reading specialists consider word recognition an accurate estimate of reading achievement (Bond, Tinker, & Wasson, 1979). Feshback, Adelman, and Fuller (1974), Glazzard (1977), and Margolis (1976) used the Gates MacGinitie Reading Tests and Teledgy (1975) used the Gray Oral Reading Test as indices of reading achievement for kindergarten screening tests. These are valid tests to use for the detection of reading errors, but not necessarily reading achievement (Bond et al., 1979).

Another assumption frequently made, but rarely recognized, is that the criterion measures' normative information is representative over an extended period of time. As examples, the studies mentioned (i.e., Colligan, 1975; Feshback et al., 1974; Glazzard, 1977; Margolis, 1976; Teledgy, 1975) all used criterion measures normed at least 10 years prior to the study. Criterion measures used for validity studies need to be representative of the construct they measure and as current as possible.

The Metropolitan Readiness Test (MRT) is frequently used as a screening test (Ferinden, Jacobson, & Linden, 1970; Flynn & Flynn, 1980; Maitland et al., 1974; Randel, Fry, & Ralls, 1977; Reynolds, 1979; Teledgy, 1975) and as a predictive criterion for school readiness for listening comprehension, visual perception, and fine motor skills (Buttram, Covert, & Hayes, 1976), a comprehensive parent questionnaire (Colligan, 1976), an auditory screening test (Margolis,

1976), and a visual-motor perceptual test (Pryzwansky, 1977). The reliability and stability of MRT subscales is low (Reynolds, 1979; Teledgy, 1975), necessitating the use of a single score. This summary score provides little instructional information to teachers, but represents an accurate method of classifying and grouping children. The appropriateness of using this test's subscales to validate tests assessing listening, comprehension, motor skills, visual motor skills, auditory listening skills, etc., is obviously controversial.

The MRT was standardized on the Stanford Achievement Test (SAS). Various forms of the SAT have been used as criteria for: the Screening Test of Academic Readiness (STAR), with subtests including picture vocabulary, letters, picture completion, copying, human figure drawing, etc. (Klein, 1977); the Developmental Test of Visual Motor Integration (Klein, 1978); ABC Inventory, which assesses general information, drawings, counting, short term memory, scientific information, and paper folding; and the MRT (Randel et al., 1977). A similar test, the California Achievement Test (CAT), has also been used as a predictive criterion for: the Slossen Intelligence Test; the Peabody Picture Vocabulary Test; the Draw-A-Person; the Developmental Test of Visual Motor Integration; and the Devereux Elementary School Behavior Rating Scale (Wallbrown et al., 1977). Both the SAT and CAT are highly reliable and their validity well established. However, the methodological credibility of using a group test to validate individual success or performance, such as in the studies listed, is questionable. When predictive validity is operationalized in terms of correlations,

however, the SAT and CAT are among the best criteria of academic achievement available.

For almost all of the screening tests described thus far, a common criterion has been teacher ratings. Teachers were asked either to complete a standardized rating scale (Feshback et al., 1974; Kirshenbaum et al., 1977) or to rank children as to preparedness or level of success anticipated in the following grade (Hess & Hahn, 1974; Novack et al., 1973; Teledgy, 1975). Some question (Teledgy, 1975; Satz et al., 1978) and others support (Glazzard, 1977; Haring & Ridgeway, 1969; Keogh & Becker, 1973) the use of teacher ratings. Since teacher ratings have been frequently used for academic screening, a more detailed analysis of two studies using teacher rating as criterion measures will be presented next.

Subjects in a study by Flook and Velicer (1977) included 245 kindergarten children in three towns who were given the Preschool Screening System (PSS). Scores on the Rhode Island Pupil Identification Scale (RIPIS), a teacher rating scale, were used as the criterion measure. Although Flook and Velicer (1977) were initially exploring the validity of the PSS, their finding that the teachers' ratings on the RIPIS were significantly different among teachers rating the same students suggested the teacher ratings were dependent upon specific raters standards or internal versus external norms. Problems in comparing teacher ratings among classes or studies creates problems for validity studies using them as criteria.

Wells and Peterson (1978) used teacher ratings (Devereux Elementary School Behavior Rating Scale) as the criterion measure. After

four teachers completed the Kindergarten Teacher Checklist on 111 kindergarten children during the last two months of the year, statistical analysis found test-retest reliability to be .94 but predictive and concurrent validity to be lacking. The investigators suggested the mental set and skill of the rater and the natural development of children as limiting factors of checklist and behavior rating scales. In sum, validity studies using teacher ratings as predictive criteria must be interpreted with caution.

Environmental Assessment in Educational Settings

An important argument for early detection and intervention for special needs children was environmental. As noted, Hunt (1961) and Bloom (1964) reviewed numerous studies and noted how external environmental events influenced intellectual and overall human development. Their reviews assisted in providing the empirical and theoretical framework for the development of many compensatory education programs for young children. Stimulating environments were provided, but rarely operationalized. For example, Head Start programs were mandated to provide enriched environments for young, disadvantaged populations. Each participating center established what it assumed to be an enriched environment. Subsequent evaluations, however, did not measure these "enriched" environments. Instead they assessed individual gain scores on tests and social economic status, as well as geographic and racial differences (see Hellmuth, 1970; Smith & Bissell, 1970). Populations, geographic regions, and program type (e.g., full year or summer only) were analyzed as opposed to the

type of environment provided. Wolf (1974) notes that "despite this accumulation of evidence (ie., Hunt, 1961; Bloom, 1964), we have persisted in our view of testing in essentially individualistic terms" (p. 508).

Bradley and Caldwell (1978), in their review of Bloom, Barker, Wright, and ellectic approaches to environmental assessment, offered another set of suggestions as to why environmental screening measures have not been adequately addressed. They presented the following conclusions: (1) there are few instruments that have been designed specifically for environmental measurement; (2) the majority of environmental measures have emphasized verbal interactions; (3) assessment of elements of the physical environment such as the number of available books, toys, and educational materials is common; (4) few instruments assess psychosocial interactions; and (5) the psychometric properties of the instruments are not well established. In sum, Bradley and Caldwell (1978) stated "the actual importance of most environmental settings is unknown. Empirical studies directed towards this question are largely equivocal" (p. 127).

Bradley and Caldwell (1978) failed to review the numerous studies that have attempted to measure elementary and secondary school environments. This next section will outline a number of these studies after a short historical perspective is presented.

Initial theoretical interest in the environment can be traced to Watson (1913), Lewin (1935), and Murray (1938). Watson (1913) considered all behavior to be environmentally determined and suggested

humans, like all animals, were passive recipients within the environment. Lewin (1936) suggested "person" and "environment" were two interdependent vectors, while Murray (1938) was the first to conceptualize the combined impact of personal needs and environmental press upon behavior. Subsequently, Anderson and Brewer (1945, 1946) and Withall (1949, 1951) expanded environmental study into the classroom by recording and measuring teachers interpersonal and verbal behavior. Anderson and Brewer (1946) made the assumption "that in a family or a schoolroom or in any social group, the behavior of one individual makes a difference in the behavior of another" (p. 9). After establishing a rigorous behavioral observation system that coded both teacher and child behaviors with a high degree of interrater reliability, the authors suggested the teacher's personality, as defined by observed behavior, is highly related to student functioning.

Withall (1949, 1951) also examined teacher interactions. His research emphasized verbal behavior. A seven item continuum with learner-centered verbalizations at one end and teacher-centered verbalizations at the other was introduced. It was proposed that classroom climate (in terms of communication patterns) could be measured. Subsequent investigations by Mitzel and Rabinowitz (1953) and Brown (1960) used Withall's method to measure social-emotional climate and academic achievement respectively.

Mitzel and Rabinowitz (1953), using two trained observers who observed four teachers four times over a period of eight weeks, attempted to determine: (1) if teacher verbal behavior is stable

from one visit to another, and (2) if verbal categorization could discriminate between classrooms. Results from their observations suggested that teachers have marked fluctuation in verbal behavior and that teachers vary in the typical classroom climate they try to provide (Mitzel & Rabinowitz, 1953).

Brown (1960) applied Withall's communication classification method to 15 third grade classrooms with 175 boys and 143 girls. Each subject was observed two times. Brown (1960) found a higher positive relationship between pupil-centered classroom climates and scores on arithmetic tests for underachievers and overachievers than average achievers. From this, Brown (1960) recommended matching the achievement level of the student with the classroom climate.

Withall's index for measuring classroom climate fails to take into account a number of potentially relevant variables. For instance, neither the intensity nor inflection of verbalization, body language, demands of the situation, nor student perception is recorded.

As most environments have many complex components, few researchers can agree as to what should be measured or what is the best way to measure it. Nielsen and Kirk (1974) reviewed some of the most typical instruments used in assessing classroom climates. They divided instruments into (1) low inference, which rely on observable, specific, and explicit information; and (2) high inference, which use subjective judgements, opinions, or perceptions. After a review of validity studies conducted with the various instruments, Nielsen and Kirk (1974) concluded that classroom climate is a complex global concept. They

also noted that classroom climate has been used frequently as a dependent measure, but rarely as an independent measure, where environment is related to cognitive or achievement outcomes (Nielsen and Kirk, 1974). As a final set of recommendations, Nielsen and Kirk (1974) argued for: (1) increased use of high inference questionnaires and scales that can be considered more efficient and economical than low inference observational strategies, as they can potentially collect more information in a shorter period with less staff time; and (2) a combination of both low inference and high inference classroom climate instruments in validity studies using achievement as the criterion.

Following the above recommendations, studies and reviews that relate educational environments to academic performance will be considered next. Of major interest to this paper are primary grade and, more specifically, kindergarten environments or climates. But, due to the paucity of research at this age and grade level, studies using college and secondary populations are reviewed first.

Stern, Stein, and Bloom (1956) demonstrated with a college population that by defining the various demands of a situation, performance or behavior could be predicted more accurately. Pace and Stern (1958) developed the College Characteristic Index. This scale requires college students to rate items regarding relationships, rules, regulations, classroom methods, classroom activities, and features of the campus. This instrument was developed from Murray's (1938) concept of "perceived climate" and his theorizing regarding environmental press.

Following this initial work by Stern and his colleagues in measuring perceived environments with university students, two major

sets of instruments for measuring high and junior high schools were developed. Herbert Walberg and his colleagues developed the first set while Rudolf Moos and his cohorts developed the second. Following Getzels and Thelen's (1960) theoretical model of "The Classroom Group as a Unique Social System," Walberg (1968) and Walberg and Anderson (1968) refined the Classroom Climate Questionnaire (CCQ) as part of the Harvard Physics Project. They tested over 2000 junior and senior high school students and teachers in 76 physics classes. Correlational results supported Brown's (1960) earlier contentions that there were predictable relationships between teachers' personalities and classroom climates (Walberg, 1968). Similarly, student perceptions of classroom climates significantly predicted learning and achievement after the results were adjusted for previous learning and IQ (Walberg & Anderson, 1968). The Learning Environment Inventory (LEI) (Anderson, 1971), an instrument modified from the CCQ to measure perceived environment, was a further refinement from the Harvard Physics Project. This inventory consists of 15 scales with seven items on each scale. Junior high or senior high students rank each item along a four point continuum ranging from Strongly Agree to Strongly Disagree. As outlined in the manual (Anderson, 1971) and noted in numerous reviews (Anderson & Walberg, 1974; Randhawa and Fu, 1973; Walberg, 1976), the LEI has been used in numerous studies with consistent results. The reader is referred to these sources and the original studies for a detailed review, but two findings relevant to this paper will be mentioned here. First, the LEI as a measure of student perception of classroom social environment

has accounted for substantially more variance in high school learning and achievement than group IQ tests. As an example, Anderson and Walberg (1974) compared three studies using the LEI and IQ as predictors of learning outcome. In all cases the LEI scales predicted learning significantly better than IQ. Secondly, the LEI has "proven to be extremely sensitive in tapping differences among groups" (Anderson and Walberg, 1974, p. 5). This high inference measure has for example differentiated between high school curriculum areas, i.e., science versus humanities versus foreign language, etc., and teaching styles (Anderson, 1971; Eash & Talmadge, 1975).

In sum, the LEI's capacity and potential in measuring the secondary classroom environment seems established. There remains, however, the issue of measuring elementary classroom environments. The My Class Inventory (MCI) is intended as a downward extension of the LEI and will be discussed in a later section. To be discussed next are studies based on Murray's environmental press ideology that measures secondary educational environments. These include Steele's development of the Classroom Activities Questionnaire (CAQ) and Trickett and Moos' formulation of the Classroom Environment Scale (CES).

Steele, House, and Kerins (1971), as part of Illinois' evaluation of that state's gifted program, developed the CAQ to assess educationally meaningful instructional climate dimensions for a diverse set of locally derived programs. From Murray's (1938) environmental press and Bloom's (1956) system of classifying cognitive operations, the CAQ was developed to assess four major dimensions of instructional climate: (1) lower thought processes, (2) higher thought processes,

(3) classroom focus, and (4) classroom climate. A mixed sample (i.e., math, language, etc.) of 131 classes and over 3000 students from grades 6 to 12 was assessed. Each of the 25 items was rated along a four point scale ranging from Strongly Agree to Strongly Disagree. Test-retest as well as within and between class reliabilities reported ranged from .59 to .91 with a median of .78. Factor analysis was reported to confirm the a priori item grouping as eight of ten logical cognitive and affective components loading together. Comparing "gifted" and "average" classes Steele et al. (1971) found significant differences ($p < .001$) for three of the dimensions, but not for lower thought processes. For evaluating gifted sixth grade classes environmental dimensions, this tool proved useful. But, as the authors warned, below this grade level most students are unable to make discriminations required of the instrument.

Although similar to the LEI, which is based on student perceptions of classroom relationships, organizational qualities, and physical environment, the CAQ measures student perceptions of characteristic activities. At least two studies (Walberg, House, & Steele, 1973; Walberg, Steele, & House, 1974) have followed Steele et al. (1971) original study and found the CAQ can discriminate perceived climates between (1) grade level, (2) classroom emphasis regarding thought processes, and (3) classes teaching various subject areas.

In a cross sectional study of 121 classes in grades 6 through 12, Walberg et al. (1973) found elementary students perceived greater emphasis in their classrooms on cognitive processes such as analysis,

creation, and synthesis, while high school students perceived their classes as emphasizing facts and memorization. In general, the higher the grade the less stimulating and enjoyable the classes were rated. The most undesirable grades were sophomore and junior years. Using the same 121 class sample, Walberg et al. (1974) compared subject areas with CAQ ratings. With a discriminant function analysis three significant functions were found: (1) Convergence-Divergence, which discriminated math from other subjects; (2) Substance-Syntax, which contrasted social studies and science with math and language arts, and (3) Objectivity-Subjectivity, which differentiated social studies from science.

Another approach to measuring classroom climates at the junior and senior high levels is Classroom Environment Scale (CES) (Moos and Trickett, 1974). Development of the CES is reviewed elsewhere (c.f. Moos, 1979; Trickett & Moos, 1973, 1974) and will not be repeated here.

Various studies using the CES have validated its utility and discriminative validity. Hearn and Moos (1978) assessed 207 classroom climates in 19 separate high schools with the CES and compared them with Holland's typology of personality and environments. After assigning each class to a typology category, the students in each class completed the CES. Results revealed that the CES could discriminate among classrooms of different subject matter. For example, investigative classes in Holland's schema such as math and science tended to emphasize task orientation and teacher control but de-emphasize involvement, affiliation, and innovation, while artistic classes such as art, music, literature, etc. were high on innovation and low on

competition, rule clarity, and teacher control, as expected. These results supported Anderson and Walberg's (1974), Randhawa and Michayluk's (1975) and Steele et al. (1971) findings that environmental measures, in this case the CES, discriminated among classrooms of different subject matter.

Moos (1978) assessed 200 junior and senior high school classrooms from 36 schools. In this study, cluster analysis was employed on mean CES ratings for each classroom. Five clusters suggest five basic classroom typologies: (1) control oriented, (2) change oriented, (3) affiliation oriented, (4) task oriented, and (5) competition oriented. Comparing classrooms from the various orientation clusters with student and teacher satisfaction, Moos (1978) determined students and teachers are significantly ($p < .01$) more interested, more secure, and happier within certain classroom orientations. "In general, students and teachers were more satisfied with innovation oriented than with control oriented classes" (Moos, 1978, p. 62). It might be assumed that preferred environments are conducive to teaching and learning.

Using factor analysis versus cluster analysis, Trickett and Quinlan (1979) derived six domains for the CES which are very similar to the five orientations described above. The six factors included: (1) rule emphasis, (2) order and organization, (3) friendly and easy-going teacher, (4) innovative student oriented teaching approach, (5) student competition, and (6) student affiliation.

For each classroom, six factor scores were computed. These scores were then individually compared by three separate sets of one-way analyses of variance. Community type (urban, suburban, rural), teacher sex, and class size were used as the independent variables. Significant differences reported for each set of analyses suggested to the authors the following: (1) factors differentiate classrooms from different communities, (2) male teachers were perceived as more orderly and organized as well as being more personable and friendly, and (3) larger classes had more emphasis on rules while smaller classes were more intimate (Trickett & Quinlan, 1979).

The results in the above study are open to question. First, factor analyses were used on a dichotomous scale. As each item is answered "true" or "false," a required continuous scale with at least five differentiating points per item (Harmon, 1978) has been ignored. Second, the authors examined the independent variables in separate analyses, which did not control for sample bias nor the loss of degrees of freedom. And third, multiple dependent measures (six factor scores) were used in separate analyses versus a MANOVA which could control for significant relationships among the factors.

A recent review of Moos (1979) supplements Moos (1978) cluster analytically derived findings that the CES relates to student satisfaction. Teachers' and students' perceptions of classroom climates tend to parallel each other. Noting that the CES can and has been given to teachers as well as students, Moos (1979) compared students' and teachers' views regarding the same classroom. Correlations

between them, using CES scores, indicated agreement with relative emphasis on various dimensions. The mean student-teacher correlation was reported to be $\underline{r}$ = .47, SD = .34. Interestingly, it was observed that "teachers generally perceive classroom environments more positively than their students" (Moos, 1979, p. 147).

Moos'(1979) conclusion that teachers' and students' perceptions of classroom climates parallel each other has not been supported by more recent studies. Cowen (1982) reported that six studies conducted at the Primary Mental Health Project (PMHP) found teacher and student perceptions of the same environment to be unrelated. Since Moos (1979) involved junior and senior high students and those studies at PMHP involved elementary students, sample differences may have accounted for result differences. Needless to say, the generalization between student and teacher perceptions cannot be assumed.

However students and teachers rate the same environment, it is not surprising that students with different personality characteristics prefer different learning environments. For example, "convergent thinkers" preferred teachers and classrooms with order and structure while "accommodators" preferred low structure and high interaction (Moos, 1979). When there was a match between teaching styles and students' personal characteristics, satisfaction increased.

Practically, student satisfaction can be assessed through student attendance at school and report card grades. Moos and Moos (1978) related classroom environment to both of the variables. With a sample of 19 high school classrooms from one high school, the CES assessed

social climate at mid-semester while student absenteeism and final course grades were assessed at year's end. Student absenteeism was significantly positively correlated with student perception of competition and teacher control, while inversely related with teacher perceptions of teacher support (Moos & Moos, 1978). This means the higher the competition and teacher control and the lower a teacher's perception of his/her classroom support, the higher the reported absenteeism. In this same study, higher grades were found in classrooms with high involvement and low teacher control. Although students were found to learn more in intellectually challenging and competitive classrooms, more tended to be absent (Moos & Moos, 1978). In essence, Moos and Moos (1978) established that social environment, as measured by student and teacher perceptions, influenced accepted objective measures of academic success in high schools. Moos and Moos (1978) suggested the high risk classroom environments (i.e., poor attendance, poor grades) can be detected and early intervention initiated in high schools, but questions remain concerning relationships between perceived environment and observed environment.

Few recent studies have been reported using multimethod approaches to assessing the environment, even though social ecologists have suggested the importance of environments' multiple dimensions (Barker, 1968; Bloom, 1964; Insel & Moos, 1974; Kelly, 1967; Moos, 1979; Weinstein, 1979). One study, Kaye, Trickett, and Quinlan (1976), tested 16 classrooms using three environmental assessment measures: (1) the CES, (2) ratings by outside observers, and (3) Flanders (1967) system

of interactional analysis. Four groups were formed from principal nominations and CES ratings. A 2x2 design with high and low levels of teacher control resulted. After 16 classrooms (four classes per cell) were determined, each classroom was observed three times and tape recorded on three occasions. Observations yielded global ratings of teacher support and control while tape recordings were used to analyze teacher-student interactions. Two sets of 2x2 analyses of variance were computed with global ratings being the dependent measure for the first analysis and teacher-student interactions for the second. Outside observer global ratings were found to be significantly different for both support and control dimensions. Two global ratings of teacher behavior were related to the CES dimension teacher control, while the global rating of support was related to the CES dimension of teacher support only (Kaye et al., 1976).

Significant results were found for three of four Flanders' (1967) categories: (1) praises and encourages, (2) accepts or uses student ideas, and (3) student talk-initiation. General conclusions from the Flanders' categories included: (1) teachers whose classrooms were rated high on CES support praised and encouraged students more and accepted their ideas more often than those with low support, and (2) teachers rated low in CES control praised and encouraged more and had more student initiated talk than teachers with high control. In sum, CES dimensions were found to relate to expected scales and variables from global and teacher-student interactions measuring control or support, but they also related to other scales not presumed to

measure those constructs. These findings suggested to the authors the need for multiple methods in assessing environments.

There is a lack of environmental research with multiple methods and with school settings other than American high schools. This next section will first review two cross-cultural studies and then studies conducted at the elementary level.

Walberg, Singh, and Rasher (1977) compared tenth year students' environmental perceptions in India. A sociometric, a 100 question IQ test, an achievement test, and the LEI were administered at the end of the academic year. Correlational and multiple regression analysis, which controlled for IQ, replicated previously discussed studies showing perceived environments are related to and predictive of subject areas taught (e.g., science or social studies) and student achievement.

In the second study, Barclay and Wu (1980) assessed multiple environmental variables with the Barclay Classroom Climate Inventory (BCCI). BCCI is a multimethod multitrait instrument composed of self reports, a sociometric using peer nominations, and teacher judgements. This inventory was normed on American elementary students from third to sixth grades. In this study a sample of 438 Taiwanese and 512 American third to sixth graders, who represented two elementary schools from each country, served as subjects. Not only were all subjects assessed by the Raven Progressive Matrices Test, but also by a grade average derived from classroom mathematics, social studies, and science performance.

The results were presented in three sections: (1) within culture comparisons, (2) between culture comparisons, and (3) BCCI cross

cultural validation. These will be summarized. Within culture comparisons were made using Multivariate Analysis of Variance (MANOVA) procedures. Significant sex differences indicated boys were more disruptive and impulsive than girls. When sex, grade, SES, and achievement were examined, it was found: (1) children in the lower grades tended to have higher self-competency; (2) boys in lower grades were more interested in high-prestige occupations; and (3) children in lower grades liked school more than those in higher grades. Achievement influenced classroom climate. Pupils with high achievement had higher (better) peer and teacher ratings in all social areas when compared with students having lower achievement. High achievers were characterized as extroverted and controlled while low achievers were introverted and impulsive. SES findings included: lower class boys were more interested with people oriented professions and lower class girls generally avoided teacher contacts and were more interested in clerical occupations than higher SES children. With respect to teacher ratings, teachers generally rated higher SES girls more favorably, in the lower grades low-achieving children from upper-class families most negative, and boys with higher achievement from lower-class families most positive.

Between culture comparisons were made with a three-way (culture, sex, grade) MANOVA. Conclusions include: (1) grade effects tend to be consistent across cultures; and (2) sex and culture have significant differences and are interactive. Two examples: (1) Taiwanese students are more interested in scientific skills and high-prestige jobs, and (2) American boys earned more negative teacher ratings, reported less

interest in school, had lower achievement motivation, and were more extroverted than Taiwanese boys.

When cross cultural validity of the BCCI was examined with achievement, 9 of 11 BCCI scales and 12 of 22 BCCI scales for girls predicted achievement ($p < .05$). Multiple correlation results indicated percent of cognitive variance accounted for by the environmental measures ranged from 39 to 43%.

In sum, achievement, teacher ratings, peer sociometric nominations, and socioeconomic patterns were found to be relevant determinants of social behavior in both cultures. The study's results support that systems can be accurately assessed and used to understand a student's school relationships and achievement.

Environmental effects appear reciprocal in nature. Some stimuli and characteristics help determine the environment; at the same time, the environment influences achievement, satisfaction, self-esteem, etc. Environment as a variable within elementary schools has been a neglected area of study and a review of a few studies will exhaust what is known.

Fraser (1979) assessed the learning environment in elementary school classrooms with a modified and downward extension of the LEI (Anderson, 1971). A sample of 204 students from seven of the highest grade level classes in seven different Australian elementary schools were administered the revised scale in a validation study. Values for Cronbachs Alpha, measuring internal consistency, ranged from $\alpha = 0.53$ to $\alpha = 0.75$ on the six scales with a mean of $\alpha = 0.63$. Correlations between scales ranged from 0.09 to 0.28 with a mean of 0.23, suggesting relatively good discriminant validity, which is the ability

of the scales to measure unique dimensions. This study reported this scale's psychometric refinement and did not attempt to relate it to achievement, self-esteem, or differential classroom functioning in any way.

Prawat and Solomon (1981) continued in an effort to validate a downward extension of the LEI. The MCI, which was the instrument used in this study, was developed by Anderson (1971) from the LEI. It consists of five nine-item scales. The five scales and a representative item include: (1) Satisfaction--most children say this class is fun; (2) Friction--most children in our class like to fight; (3) Competitiveness--most children want their work to be better than their friend's work; (4) Difficulty--in our class the work is hard to do; and (5) Cohesiveness--all of the children in my class like one another. Seven classes--one combination first/second grade, two second grades, and two third grades--were initially tested with both the MCI and a sociometric measure developed by Singleton and Asher (1977). Instructions and items were read to the students in order to control for reading levels. After initial item analyses, 19 of the 45 items were deleted due to lack of internal consistency and discriminating power. A cross-validation study with a second sample followed. The second sample had 189 children from eleven primary grade classrooms. Alpha coefficients from this investigation ranged from .77 to .52 with a mean of .60, while correlations between scales ranged from .10 to .23 with a mean of .17.

Concurrent validity was determined by relating MCI results with the sociometric ratings. Sociometric ratings were manipulated to give

a "sex-bias" index. This index was derived in the following way:

> The average play and work rating given each child to his or her male and female classmates was computed; these scores were subtracted, summed across children, and divided by the number of raters within the class to yield a classroom "sex-bias" index. (Prawat & Solomon, 1981, p. 572)

As predicted by the authors, sex-bias was significantly and positively related to the Friction scale. Other non-significant findings between the sex-bias index and scales included: a positive relationship with Competitiveness and a negative relationship with the Satisfaction and Cohesiveness scales, which provided limited support for the validity of the revised MCI.

To conclude their validity study, Prawat and Solomon (1981) reported a series of analyses of variance to "determine the extent to which scale scores significantly differentiated between classrooms in the developmental sample" (p. 571). Although none of the analyses were reported in the article, the authors stated the classroom effect was highly significant ($p < .001$) for all scales. In general, the MCI appears to have strong enough psychometric qualities to warrant further investigation.

Another study (Morrison, 1979) investigated classroom structure, work involvement, and social climate. Using the MCI as a measure of social climate, and classroom observations as measures of classroom structure and work involvement, Morrison (1979) compared 32 fourth, fifth, and sixth grade classrooms. Univariate analysis of variance results suggested to Morrison (1979) that classroom social climate varied among classrooms with various structure and activity levels.

The four classroom categories represented may present different learning environments, which are positively mediated by teacher provided structure.

As with the LEI, the MCI offers one option to measuring the classroom environments. Needless to say, further refinement with appropriate statistical analyses are required. The MCI is not the only method of assessing elementary school environments. Other instruments and methods used with elementary classrooms will be described forthcoming.

Weisz and Cowen (1976) explored classroom environment from the teacher's perspective rather than from the student's or observer's perspective. The Classroom Information Sheet (CIS) was devised to assess both structured and psychosocial aspects of class environments. Seven psychosocial dimensions of Moos and Trickett's (1974) CES were combined with structural items such as: amount of time children spent at seat work; teacher time spent with individuals, small groups, or the whole class; and etc. These composed the items that were rated on a five-point continuum.

Both CIS and the Classroom Adjustment Rating Scale (CARS) (Lorion et al., 1975), which measures school adaptation, were administered to 33 primary grade classroom teachers. Pearson correlations between CIS and CARS scores found some significant relationships with the structural environment, but little with the teacher perceived psychosocial environment (Weisz & Cowen, 1976). As the authors suggested, further refinement of the CIS is needed before conclusions between

teacher perceived environment and other educational variables are made.

Gesten, Cowen, DeStefano, Weisz, and Milling (1979) report a refinement of a teacher method for assessing elementary environments. By adapting items from the CES and CIS, a 42 item scale was developed. A sample of 220 primary, i.e., first through third grade, teachers completed the form. A factor analytic solution suggested five factors: (1) disruptiveness, (2) close contact, (3) rule cognizance, (4) involvement, and (5) achievement orientation. Analysis of variance results suggested that third grade classes were less work oriented and had more flexible teaching than the younger grades. Suburban schools were lower in work orientation, more open, and more flexible in teaching approaches, and had more student involvement than city schools (Gesten et al., 1979).

Making no assumptions regarding the results' validity, the use of teachers' perceptions of primary environments merits further study. Most, if not all, of the environmental measures and observational systems reviewed require skills and abilities beyond the typical kindergarten or first grade pupil. Primary grade teacher perceptions and observations may be one valid measure of perceived climate at the younger grades.

Toro, Cowen, Gesten, Weissberg, Rapkin, and Davidson (1981) not only assessed elementary teacher environmental perceptions, but also elementary grade student perceptions. Thirty classes divided evenly among second, third, and fourth graders were administered four measures: (1) Classroom Information Form (CIF), another downward refinement of Moos and Trickett (1974) and Gesten et al. (1979);

(2) KIDDIE, an unpublished 18 item scale for elementary children to rate their environment based upon Moos and Trickett (1974); (3) Child Behavior Rating Scale, a measure of children's adjustment; and (4) a peer rating sociometric, which used class means to measure class liking. Contrary to Moos (1979), little agreement was found between teacher and pupil perceptions of classroom environments as measured by the CIF and the KIDDIE respectively (Toro et al., 1981). Part of this discrepancy may be related to the instruments' psychometric properties. For example, neither instruments have reported measures of internal consistency, but 15 correlations among the eight KIDDIE scales are significant by $p < .05$ and 11 of those 15 are significant at $p < .01$. The redundancy among KIDDIE variables suggest two or possibly three student rated environmental dimensions versus eight.

As a second purpose to their study, Toro et al., 1981, attempted to assess relationships between social environments and adjustment variables. Eighteen stepwise multiple regression analyses were computed. The sociometric rating and eight scales from the Child Behavior Rating Scale were each used as dependent measures, once for the KIDDIE "variables" and a second time for the teacher rated CIF environmental variables. In all 18 regression analyses the background variables, grade, and income were entered to control for some of the error variance. Three of these 18 analyses proved significant at $p < .05$, and background variables accounted for "substantial variance (15-30%) in each of the three analyses" (Toro et al., 1981, p. 7).

The findings of this study are uninterpretable from a statistical perspective. First, there is an overwhelming probability that one,

if not two, of the significant findings would be found by chance alone considering the number of independent analyses. Secondly, univariate techniques are used with multiple dependent measures. Appropriate techniques might include discriminant analysis or canonical correlations which account for multiple dependent variables and their interactions. In sum, the multiple environmental measures approach with multivariate statistical methodology seems theoretically sound, but has not been appropriately tested at the primary or elementary level.

Summary

For the past four decades environment as a determinant of classroom behavior has been explored. Starting with kindergarten and elementary grades (Anderson & Brewer, 1945, 1946; Withall, 1949, 1951) the environmental studies shifted to college (Moos, 1973; Pace & Stern, 1958; Stern, 1970; Stern, Stein, and Bloom, 1956) and then senior and junior high schools (Anderson, 1971; Anderson & Walberg, 1974; Moos and Trickett, 1974; Trickett and Moos, 1973). More recently there has been a return to studying primary and elementary environments (Fraser, 1979; Gesten et al., 1979; Morrison, 1979; Prawat & Solomon, 1981; Toro et al., 1981; Weisz & Cowen, 1976), but no recent studies have assessed kindergarten environments.

Some consistent results have been found across ages, different schools, and cultures. (1) In academic settings, perceived environments have accounted for as much and frequently more than the variance accounted for by differences among persons (Moos, 1974, 1979; Walberg, 1976; Wolf, 1974). (2) School environments, like all

environments, are multiply determined. The physical environment (Loughlin, 1977; Moos, 1974; Weinstein, 1979), the teacher and student-teacher interactions (Flanders, 1969; Kaye et al., 1977; Withall, 1949, 1951), and psychosocial domains such as organizational structure, interpersonal relationships, and goal orientations (Anderson & Walberg, 1974; Moos, 1973; Walberg, 1976, 1979), and etc. all affect behavioral performance. (3) Another replicated finding is that social climate factors can be reliably measured (Anderson, 1971). Consistent stable factors are apparent (Cowen, 1977). This suggests that environments have relatively enduring characteristics over time. And finally, (4) school environments have been assessed via three basic methods: (a) student perceptions, (b) teacher perceptions, and (c) outside observers.

Deficiencies in environmental research are also apparent. They include: (1) no studies involving kindergarten climate and few involving primary grades are reported; (2) multimethod multivariate procedures are typically lacking; (3) multivariate statistical analyses are frequently ignored when multiple dependent measures are assessed; and (4) most environmental assessment instruments at the primary grade level lack appropriate psychometric guides, such as reliability or validity measurements.

In conclusion, the environment is a most important but little studied determinant of classroom behavior. This is especially true at kindergarten and the primary grades where secondary preventative interventions seem to have their greatest impact. Assuming it is

important to match children with environments to maximize their potential (Hunt, 1975; Insel & Moos, 1974; Kelley, 1969), it seems fitting that we not only measure children, but also their environments.

In an attempt to respond to the aforementioned need, the specific goals of this study are as follows:

1. To assess the predictive validity of a multivariate kindergarten childrens' screening battery in determining end-of-year performance as assessed by multiple end-of-year measures.

2. To assess the predictive validity of a multivariate environmental screening battery in determining end-of-year kindergarten performance as assessed by multiple end-of-year measures.

3. To assess the predictive validity of a combined person-environmental screening battery in determining end-of-year kindergarten performance as assessed by multiple end-of-year measures.

II. METHOD

Subjects and Setting

Kindergarten students (N=209) from three urban public schools in a medium sized southeastern city were individually tested during the first week of the 1981-82 school year with a paraprofessionally administered battery (c.f. below) as part of the state mandated screening program. Assessed demographic characteristics included: sex, race, age in months, and SES based on parents' education. Subjects were assigned to the following SES categories: Low--an average of both or only parent(s) with less than high school education; (2) Middle--an average of both or only parent(s) with at least a high school diploma(s) but not a four year college degree; (3) High--an average of both or only parent(s) with a college degree or above. See Table 1 for details.

The schools involved with this study included children in grades kindergarten to fifth. Enrollments at midyear were as follows: School A--613; School B--586; and School C--415. School A was inner-city and poor, as it qualified for Title I, while Schools B and C were from more suburban areas. School C, according to the principal's and teachers' reports, had a dichotomous population. Its catchment area included both residential areas inhabited by professionals and government subsidized housing projects for the low income or unemployed.

At the beginning of the school year each of the three school principals had over 25 years experience in public education. With

TABLE 1. FREQUENCY OF STUDENT'S DEMOGRAPHIC CHARACTERISTICS AND TEACHERS' EXPERIENCE LEVELS

		STUDENT CHARACTERISTICS													TEACHER	
		SEX		RACE			AGE IN MONTHS				SES					
SCHOOL	CLASS & TEACHER	MALE	FEMALE	WHITE	BLACK	OTHER	LESS THAN 60	60 TO 64	65 TO 69	70 OR GREATER	LOW	MIDDLE	HIGH	NOT REPORTED	TOTAL TEACHING EXPERIENCE	KINDERGARTEN EXPERIENCE
	A1	12	14	17	8	1	5	5	12	4	15	5	1	5	3	1
A	A2	13	14	15	12	0	2	8	10	7	16	8	2	1	3	1
	A3	12	12	18	6	0	2	10	8	4	15	4	3	2	4	3
TOTAL		37	40	50	26	1	9	23	30	15	46	17	6	8		
PERCENT		48	52	67	34	1	12	30	39	19	60	22	8	10		
	B1	9	14	20	3	0	1	7	9	6	6	11	5	1	7	7
B	B2 B22	11	14	25	0	0	0	6	13	6	8	13	1	3	9 6	9 1
	B3	10	16	25	1	0	3	7	12	4	7	13	1	5	5	3
TOTAL		30	44	70	4	0	4	20	34	16	21	37	7	9		
PERCENT		41	59	95	5	0	5	27	46	22	28	50	9	12		
	C1	9	9	17	1	0	3	6	4	5	5	6	0	7	15	13
C	C2	11	10	19	1	1	3	6	6	6	11	8	2	0	9	2
	C3	10	9	18	0	1	2	6	6	5	6	4	2	7	4	4
TOTAL		30	28	54	2	2	8	18	16	16	22	18	4	14		
PERCENT		52	48	93	3	3	14	31	28	28	38	31	7	24		
GRAND TOTAL		97	112	174	32	3	21	61	80	47	89	72	17	31		
GRAND PERCENT		46	54	83	15	1	10	29	38	22	43	34	8	15		

the retirement of the principal for School A between the first and second half of the school year, a new principal was appointed with minimal experience. Throughout the entire year there were two male and one female principals.

The nine kindergarten teachers, three from each school, were white females. All were state certified to teach kindergarten. One teacher, B2, left for maternity leave with six weeks remaining in the school year. Her substitute, B22, had the same characteristics as outlined above. Teaching experience for each teacher is described in Table 1.

At the end of the year attrition had reduced the student sample size from 209 to 170 of the originally assessed sample. As variables were collected throughout the year, new students were allowed to participate whenever they could. For example, when sociometric ratings were taken for a student, each student who returned a permission form and provided ratings, whether they were in the class at the start of school or not, contributed to other students' mean class ratings. For each analysis only those cases with complete sets of variables for that analysis were used.

Measures

Three sets of measures were used in this study: (1) individual child, (2) environment, and (3) end-of-year. The child measures were those variables collected on each student during the initial screening at the beginning of the year. These measures included: student performance on individually administered tests, parent ratings and

descriptions, and teacher ratings. Environmental measures were collected at midyear and included: student, parent, and teacher perceptions; peer sociometric ratings; and classroom observations. End-of-year measures collected included teacher and parent ratings and child performance on district tests. Each set of measures is described below and all unpublished instruments are presented in Appendix A.

Child Measures

Individually administered scales included selected subtests from the McCarthy Scales of Children's Abilities (MSCA) (McCarthy, 1972). The following eight subtests from the MSCA were administered to assess various cognitive and motor abilities.

1. Word Knowledge. Receptive and expressive language ability is measured by having a child point to five objects pictured on a card, then name four pictured objects, and finally define words.

2. Number Questions. Quantitative ability is tested by having a child respond to verbal questions involving number facts and quantitative concepts such as: more-less, half, simple addition, etc.

3. Counting and Sorting. This quantitative task requires the child to count blocks, sort them into different groups, and demonstrate knowledge of ordinal relationships.

4. Picture Memory. Short term visual memory and verbal abilities are tested. The examiner exposes a card showing six pictures and names each item in 10 seconds. The child must then recall the names of these objects after the stimulus card is removed.

5. Draw-A-Design, (DAD). This is a perceptual performance test that require a child to draw progressively more difficult geometric figures.

6. Draw-A-Child, (DAC). The student draws a picture of a child. This task assesses perceptual performance and general cognition.

7. Conceptual Grouping. This is a perceptual performance and conceptual task where a child shows his/her understanding of basic shapes, colors, and sizes by demonstrating classification skills.

8. Leg Coordination. This subtest assesses several lower extremity motor skills. The items include: walking backwards, walking on tiptoes, walking on a straight line, balancing on one foot and then the other, and skipping.

Two subtests from the Developmental Learning Program (DLP) (Yoakley & Underwood, 1973) were administered to the kindergarten children. The DLP is an integral part of the kindergarten curriculum. It emphasizes the developmental nature of learning in a criterion referenced framework. DLP skills assessed as part of the present study included:

1. Laterality. A student's dominance or sense of right and left was assessed by observing the consistency by which he/she used the same body side for tasks involving hands, eyes, and feet.

2. Body Awareness. This test assesses a student's ability to identify body parts (face, hair, elbow, etc). After a body part is stated the child is required to point to that part. Potentially, 15 body parts can be identified.

Parent ratings from two instruments were translated into four child screening variables. The Kindergarten Developmental Review (KDR) (Lorion, Hightower, & Work, 1981) is an 87 item parent report form. It elicits information on the child's social and developmental milestones, birth history, medical history, special needs which include visual, auditory, speech, or other known deficits, family stability, and self-help skills. Two scales were derived from this research instrument:

1. KDR Total Risk. This scale is rationally derived from all KDR items except those labeled self-help skills. The higher the risk among items the higher the risk score. For example, if a child was born premature, a higher risk score was assigned compared with a child born at full term. Or, a child with a hearing loss was rated more at risk than one with normal hearing. This scale is experimental as psychometric studies have not been concluded.

2. Self-Help Skills. Seven self-help items from the KDR are rated on a five point scale ranging from 1-Never to 5-Always. Item examples include: Child goes to the toilet without help, Child uses a table knife for spreading, This child ties his/her shoes without help, etc. Reliability and validity estimates are undetermined.

The Child Behavior Form (CBF) (Lorion, Barker, Cahill, Gallagher, Passons, & Kaufki, 1981) is the second instrument used to acquire parent ratings. This 28 item scale assesses children's adaptive and social behaviors. For each item behavior frequencies observed by the parent are rated on a five point scale which ranges from 1--Never, if

this behavior never occurs, through 2--Monthly, 3--Weekly, and 4--Daily to 5--Always, if this behavior occurs many times during the day. Item examples include: 1. Smiles or laughs, 6. Seeks attention, 19. Learns quickly, etc. Twelve items are reverse coded (e.g. Items 1 and 19 above) and must be recoded before scoring. Two scales were extracted:

1. Parent CBF Sum. After a parent rates each item and recoding occurs, the 28 items are summed. The higher the sum, the higher the perceived risk or social/adaptive difficulties. No reliability estimates are published for this scale. However, a study in progress (Lorion, Hightower, & Work, 1982) with a sample of 750 parent-completed CBFs reveals an Alpha coefficient of .74.

2. Parent CBF Scale 1. Four items from the original 28 item CBF pool are summed. A child with a high rating on this factor analytically derived scale is observed to be irritable, easily discouraged, sulking or pouting, and crying frequently. An Alpha reliability estimate is .71 (Lorion et al., 1982).

Two teacher ratings are similarly derived from the CBF as were the parent ratings. The teacher ratings include: CBF Teacher Sum and CBF Teacher Scale 1.

1. Teacher CBF Sum. Teachers rate children's social and adaptive behaviors as observed in the classroom. Since Lorion et al. (1981), an extensive factor analytic, psychometric study of 2400+ teacher completed CBFs has been in progress and has found the Alpha reliability coefficient for CBF Teacher Sum to be .83 (Lorion, Hightower, Work, & Cole, 1982). Validity estimates are in the process of being determined with the Metropolitan Readiness Test and end-of-year teacher ratings.

2. Teacher CBF Scale 1 is different from CBF Parent Scale 1. Seven items compose this factored scale. A high score describes an acting out aggressive child. From Lorion, Hightower, Work, and Cole's (1982), study coefficient Alpha is .84. As with the CBF Teacher Sum, predictive validity studies are in progress.

The last child variable was created from the parent completed CBF and teacher completed CBF on the same child. By subtracting one sum score from the other a discrepancy measure between parents' and teachers' observations of perceptions can be determined. The higher the difference score the greater the divergence between raters. CBF scores have never before been used in such a manner nor has any study reviewed to date used such a combination with any measure.

Environment Measures

During the study's second phase, measures to assess the environment were taken from four sources: parents, teachers, students, and classroom observations. The resulting variables from these measures were used to assess three environmental levels: the individual, the class, and the school. Each source, the measures taken, and the level to be analyzed are described.

Parents

1. The Parent Opinion Inventory, (POI) (National Study of School Evaluation, 1981a) was developed to assess parent attitudes toward their child's school and its programs. The POI contains 53 items rated on a five point scale. Response designates were A. Strongly Agree, B. Agree, C. No Opinion, D. Disagree, and E.

Strongly Disagree. Item examples include: 6. Our community is actively involved in operating the school; 19. Discipline is not a serious problem in our school; 46. Our school is well maintained; 49. It is easy to make appointments to see teachers in our school; etc. The manual lists 11 rationally derived subscales, but only the 53 item full scale was used in this study. The coefficient Alpha for this scale is .91. This reliability estimate is based on a sample of 1566 parents from nine states representing all geographical sections in the United States during the 1978-1979 school year. No test-retest reliabilities are available. Face validity was determined through a panel of experts and judgements from parents. As each kindergarten parent was asked to complete this inventory, the total score served as a variable unique to each individual student.

2. The Parent Opinion Inventory Parent/School Difference is found by subtracting the individual score of each kindergarten parent from the means of the items for that school. This variable measures the discrepancy between a kindergarten parent's response and the mean school ratings given by the parents of second, third, and fifth graders. The more similar a kindergarten parent perceives the school compared with this parent population, the lower the score on this variable.

Two other variables are POI derivatives. Both involve the Teacher Opinion Inventory, which will be described next. Another scale, School Problem Area Survey, will also be described before the Parent Opinion Inventory/Teacher Opinion Inventory combinations.

Teacher

1. The Teacher Opinion Inventory, (TOI) (National Study of School Evaluation, 1981b) was developed to assess teacher perceptions toward many school facets. Its 64 items have five choices which frequently range from A. Very Satisfied through B. Satisfied, C. Neither satisfied nor dissatisfied, D. Dissatisfied, to E. Very Dissatisfied. Many items, however, have response formats which range from A. Always to E. Never, or A. All to E. None, or A. Excellent to E. Poor, depending on the item's intent. For instance, item "44. Are you satisfied or dissatisfied with your school?" uses a satisfaction format while item "2. When you need to talk to an administrator can you do so with relative ease?" is on an Always--Never continuum.

The inventory's five rational response groupings include: (1) Organization and Administration, 11 items; (2) Curriculum and Instruction, 29 items; (3) Student Discipline, Counseling, and Advisement, 10 items; (4) School/Community Relations, five items; and (5) Job Satisfaction, three items. The manual notes that for elementary school teachers, 11 items may be inappropriate. For example, few elementary schools have foreign languages, vocational education programs, or business or dramatics courses, which can be rated by teachers. Similarly, few have counseling and advisement for those students entering college. The 11 questionable items were excluded from this study. No individual reliability coefficients were determined for the five response groupings, but coefficient Alpha, for the entire scale, which is based on 1435 teacher responses in seven states, is .91. Face

validity is adequate as assessed by a panel of experts and judgements from parents. This measure was used to describe the schools.

2. The School Problem Area Survey: Staff (Human Resources Research Organization, 1974) is a 70 item questionnaire with six response options: (1) Extreme problem, (2) Considerable problem, (3) Moderate problem, (4) Light problem, (5) No problem at all, and (6) Exceptionally Good. Teachers estimate the severity of the problems they see among students, teachers, the principal, and the community. The survey was developed as a screening device for identifying problem areas in schools. After consultation with teachers, principals, psychologists, and an extensive literature review, a pool of 300 items was narrowed to the present 70 through pilot testing and psychometric evaluation. The questionnaire has 11 rationally derived sections which include: 1. Student Characteristics and Relationships, six items; 2. Teacher-Student Relationships, six items; 3. Teacher Characteristics and Relationships, six items; 4. Principal-Student Relationships, six items; 5. Principal-Teacher Relationships, six items; 6. School-Community Relationships, six items; 7. Student Problems, 14 items; 8. Community Problems, nine items; 9. Administrator Problems, seven items; 10. Facility Problems, two items; and 11. Teacher Problems, two items. The reliability coefficient, which was determined by randomly selecting one of 13 schools and assessing that faculty's (N=37) responses in regards to internal consistency, is .96 for the whole survey and ranges from .79 to .97 with a median of .92 for the subsections. Face validity was established by a panel of experts. This is a teacher measure regarding their perceptions of their school.

Parent/Teacher Measures

The POI and TOI share 22 common items. This allows for direct comparison of respondent attitudes on these items. Two variables were derived from these common items.

1. The Parent/Teacher Opinion Inventory Difference (POI/TOI) compares the kindergarten parents' responses to their child's kindergarten teacher's responses. A difference score measures the similarity between these adults regarding their perceptions of their schools. The higher the score the greater the disagreement between parent and kindergarten teacher.

2. Parent/Teachers' School Mean Difference variable is analogous to the POI/TOI. With this variable the school means computed for the 22 common items from all the responding teachers for that school are substituted for the kindergarten teachers' responses. A faculty-parent perception difference results.

Student Measures

Two levels of student measures were taken: (1) individual and (2) school. The individual measure was taken from kindergarten students, while the school measure was taken from second, third, and fifth grade students.

1. Sociometric Status is a peer rating scale patterned after Singleton and Asher (1977) which required each kindergarten child to individually rate all students from their classroom on a five point scale in terms of "how much they like to play with" each classmate and "how much they like to sit or work with" each classmate. Five faces

ranging from smiles to frowns were used to define the scale designators. Student names were presented in a random order for each administration as were the order of faces.

2. The My Class Inventory (MCI) (Anderson, 1971), which contains 60 items on a three point yes/maybe/no scale, served as a measure of student perception of school satisfaction, friction, competitiveness, difficulty, cohesiveness, and goal direction. Individual scale reliabilities reported in the manual for 8-12 year-olds range from .57 to .77 but are not reported for younger children. This scale is experimental in nature and still under development (Anderson, 1971).

Observational Measures

The Early Childhood Environment Rating Scale (Harms & Clifford, 1980) with its 37 items, seven subscales, and composite full scale was used to rate the nine kindergarten classroom environments. Each item is rated on a seven point scale. Descriptive notes are provided for each item at ratings (1) inadequate, (3) minimal, (5) good, and (7) excellent, while ratings, 2, 4, and 6 are midpoints for conditions that fulfill all the lower description and some, but not all, of the higher. Raters remain in the classroom until all items are observed or an interview with the teacher provides enough information to make a rating. Two to three hours are required for most observations.

The seven subscales include: (1) Personal Care, five items; (2) Furnishing and Display, five items; (3) Language and Reasoning, four items; (4) Fine and Gross Motor, six items; (5) Creative Activities,

seven items; (6) Social Development, six items; and (7) Adult Provisions, four items. Standardized Alpha coefficients reported for the seven subscales from a sample of 25 classrooms ranged from .44 to .81 with a median of .57, while the total scale was .86. Interrater reliability for classroom samples of 22 and 25 had rank order correlations by items of .94 and .93. This measure's face validity was determined by seven nationally recognized experts in early childhood education areas. Over 78% of the items were judged to be of high importance. Concurrent validity was determined by comparing ranks of trainers, who were consultants to a class, with outside observers using this scale. Rank order correlations ranged from .74 to .70. The authors note that no universally accepted norms for early childhood environments exist.

End-of-Year Measures

Outcome criteria used in measuring school success came from four measures: (1) Teacher Competency Rating Form, (2) Kindergarten Report Card, (3) Academic Skills Posttests and (4) Parent Competency Rating Form. The first two measures involved teacher ratings, the third, student performance on Math and Language Arts tests, and the fourth, parent ratings. As the Teacher and Parent Competency Rating Forms were the same form, but completed by different sources, they will be described together followed by the Report Card and finally the posttests.

1. With the Competency Rating Form teachers or parents individually rate their children on 24 items composing four behavioral areas:

(1) Motor, five items; (2) Academic, six items; (3) Social, six items; and (4) Adaptive, seven items. Each item is rated on a five point scale that forces item ratings to be normally distributed across the kindergarten population. The response categories include: (1) High Performance--Top or Best 5% (1 to 3 children per class); (2) High Average Performance--Better than average but not tops (4 to 6 children); (3) Average Performance--Middle 50% (12 to 18 children per class); (4) Low Average Performance--close to average, but having some difficulties (4 to 6 children); and (5) Low Performance--Lowest 5% (1 to 3 children).

The Competency Rating Form was composed after teacher and parent interviews with the intention of developing a form that would validly or accurately discriminate between children's functioning levels at the end of the school year. One criteria for determining promotion or retention within the schools was teacher ratings.

2. Kindergarten Report Card. Six times a year the teacher rates each child for the following: (a) Physical Development, four items; (b) Social/Emotional behavior, six items; (c) Work Habits, five items; and (d) Expressive Language skills, seven items. Each item is rated with a three point scale: 1 = Needs Help, 2 = Improvement and 3 = Satisfactory. A composite score for each of the developmental areas was created by summing all items in an area across the six ratings. A satisfactory report card was a second criterion for passing.

3. Academic Skills Posttests. As part of a recently implemented state-mandated Basic Academic Skills Program, posttests assessing math and language arts skills were given at the end of the year's

instruction. At the kindergarten level, 25 math objectives measured by 87 items and 15 language arts objectives measured by 45 items were used. A student needed to master 70% of the posttests' objectives as a third criterion for promotion.

Procedures

Three sets of data were collected in three phases. Individual child measures were collected during phase one. Environmental variables were gathered during phase two. The school outcome or success measures were collected from the schools in phase three. Each of these phases will be outlined below.

Phase one. The first phase is part of a larger research project that is described elsewhere (Hightower, Work, & Lorion, 1982; Lorion, Hightower, & Work, 1982; and Work, Hightower, & Lorion, 1982), but will be detailed here. During the first week of school all entering kindergarten students were individually screened. Paraprofessionals, including parent volunteers and college undergraduates, were trained in standardized assessment procedures, specifically with the administration of the individual measures (i.e., McCarthy Scales of Children's Abilities and Developmental Learning Profile). They performed the testing under the supervision of either a Ph.D. or master's level psychologist.

As recommended in the literature (Sahin 1977, 1979), and as evidenced by field testing, a station approach was used. It was hoped that by successively making tasks more difficult and with breaks between testing, each child's success would be maximized and fatigue minimized. Depending upon the principal's preference, four stations

assessing different characteristics were set up in either the school's gymnasium or cafeteria. At the first station the child was weighed and his/her height was taken. Station II involved the McCarthy Leg Coordination subtest and other gross motor skills. Station III consisted of Picture-Memory, Number Questions, Word Knowledge, and Conceptual Grouping. Station IV involved the administration of DAD, DAC, Counting and Sorting, Laterality and Body Awareness subtests. Not only were these subtests chosen due to their predictive validity in past studies (Kaufman, 1977; Kaufman & Kaufman, 1978), but also for their ease in administration and their ability to test a wide range of cognitive dimensions. After testing at each station was completed, the child was praised for his/her efforts, given a star for participating, and escorted to a waiting or testing area. Effort was made to accept and reward the children for functioning at their performance levels.

All three schools conducted the screening simultaneously. Typically 12 to 18 students were assessed each morning and the test protocols were scored in the afternoon. All tests except DAD and DAC were scored according to the manuals by the paraprofessionals and checked via psychologist supervision. As the paraprofessionals had consistent difficulty scoring DAD and DAC subtests, all drawings were scored by an M.A. psychologist.

During the first two weeks of school, KDRs and CBFs were sent home to be completed by the parents. Teachers in one school offered their students suckers if they returned these forms to school. Not surprisingly, return rate at that school was excellent: 93%. The

other schools had acceptable return rates of 83% and 82%.

The final collection of phase one occurred in November. Teachers completed the CBF as parents had earlier. It was recommended that teachers have at least six weeks exposure to their students before they complete the CBF (Lorion et al., 1981).

Phase two. The collection of environmental measures began in January. Two sets of permission letters and forms were sent home from the schools. One set was for kindergarten (Appendix B1) and the other for second, third, and fifth grades (Appendix B2). Enclosed with all letters and student permission forms were POIs. Successful return of the forms by the kindergarten students, whether the forms were completed or not, were rewarded with suckers in all schools. In the higher grades a "thank-you" was given. Return rates for kindergarten students was 79% and for second, third, and fifth, 52%. These rates are summarized in Appendix C.

Concurrent with the administration of the POI, all faculty in the three schools were given the TOI and School Problem Area Survey as measures of perceived environment. In all schools these forms were distributed after a half hour explanation of the study was given to the teachers. The format and material covered at each presentation was the same. Teachers and principals were told all the information gathered from their school would be confidential, but that reports' aggregate data would be made available to them. Summary reports were given to the principals on May 1, 1982, one month after completion of data collection for Phase II.

After the teacher meetings were held and student permission forms returned, student data was collected. Beyond the initial state required screening program, all participation was voluntary. As noted, parents received a letter and attached permission forms requesting their and their child's participation in the study. Only those students with signed permission were involved in the study.

Kindergarten students were individually administered the sociometric by trained graduate or undergraduate research assistants who were unaware of Phase I results. As noted above, directions, forms, and randomization procedures for the sociometric were standardized and are described in Appendix E.

Kindergarten students completed sociometrics on each other. Second, third, and fifth grade students completed the MCI on their classes. Standardized directions and examples were read for each class and are detailed in Appendix H. In all cases, all MCI items were read aloud to control for respondent reading levels. Field testing with the MCI below second grade proved unsuccessful. Even when the items were read, the majority of students below second grade were unable to perform the rating task.

The Early Childhood Environment Rating Scale was the last environmental measure taken. After the sociometrics and MCIs were completed in mid-March, classroom observations began. All six observers were trained according to the manual. First, they read the manual and were able to ask questions regarding the items. Second, they had three to six hours of practice observation in kindergarten classrooms. Practice for each observer continued until 80% of their

ratings were within one point and 50% were the same as a master observer. The practice classrooms were in an elementary school from a school system other than the one in which the three experimental schools were located. At the end of each practice period the raters were encouraged to discuss and resolve any discrepancies among their ratings. Without exception, the first observation by any observer in an experimental class was always conducted with another independent observer. Reliability checks with independent observers were made at least once for every two observations, or reliability checks were made on 50% of the observations. Observations took between one and a half and three hours for each classroom. After an initial set of observations was made during the last two weeks in March by three observers, a second set of observations by a different set of three observers was made a month later in April. Each classroom had at least two classroom observations a month apart by different observers.

Phase three. End-of-year outcome measurements, or Phase III of data collection, occurred during the last two weeks of the 1981-1982 school year. Letters went home from two schools requesting kindergarten parents to complete the Competency Rating Form on their child (Appendix B3). At one school, after deliberations with the principal and teachers, it was decided that such a collection effort would be impossible. As before, the kindergarten students in the two participating schools were rewarded with suckers for successful return, but not necessarily completion of the Competency Rating Forms. In these schools there were 51% and 72% return rates. The return total reflects, in part, the fact that regular teachers took personal leave days during

this period and substitute teachers were unaware of what they were supposed to do.

The week before classes ended the teachers were also given the Competency Rating Form. All children from every class were rated. Earlier in the year and during the last week of school each of the teachers was given detailed instructions, practice, and a chance to ask questions about the rating procedures.

Finally, report card grades and basic skills test results were gathered from each child's record. Since these measures had to be completed for the child's permanent record, no extra teacher work was needed. At no time during this study were the teachers told report card or basic skills results would be collected until the last week of school.

Missing Data

At the completion of data collection the following guides for handling missing data was implemented: (1) if a form had less than 95% of its responses complete, it was considered incomplete and no changes were made; and (2) if a form had at least 95% of its responses complete, the mean rating for that missing item was substituted for the missing response. Means were taken from the level of measurement described under measures. For example, if the item was part of a class measure a class mean was used, or if the item was part of a school measure the school mean was used. There was one exception made to these guides. When teacher B2 went on maternity leave, she had not completed the fifth grading period's report card grades for her

students, which were due that week. Consequently, no grades were given to her students for the fifth grading period. For class B2 Spearman correlation coefficients between the fourth and sixth grading periods were computed for each item (c.f. Appendix D). As 16 items from period four to period six were rated the same for each child, and five of the six remaining coefficients were above .86, the grades the child obtained in period six were also used for those missing in period five. If this substitution was not made, 23 cases from one school or a whole class would have been deleted causing deficient sample sizes for most analyses.

III. RESULTS

The results of this study are presented in four major sections. The first section describes the variables. It includes descriptive statistics of the study's measures and internal reliability estimates. The second section analyzes characteristics and relationships of the variables among schools and classrooms. Child, environmental, and end-of-year variables are presented as dependent measures, while school and class are presented as independent measures in a series of Multiple Analyses of Variance. The third section reports correlational results among child, environmental, and end-of-year results. Relationships among variables and predictive validity indices (i.e., correlations between child variables with end-of-year and environmental variables with end-of-year) are described. The fourth and last section presents discriminant analyses results. Discriminant functions are computed for four functioning areas for two purposes: (1) to determine what set of variables discriminates between functioning levels, and (2) to determine the productivity validity or classification accuracy of the child, environmental, and child and environmental batteries.

Descriptive Analyses

Means, standard deviations, sample size, and ranges for the child, environmental, and end-of-year measures are reported in Tables 2, 3, and 4. It should be noted that the number of subjects varies across analyses in large part as a function of parent return rates. Sample sizes vary across the study's remaining analyses too because only

TABLE 2. SAMPLE SIZE, MEANS, STANDARD DEVIATIONS, AND RANGE FOR CHILD VARIABLES

CHILD VARIABLE	N	MEAN	STD. DEV.	RANGE
MCCARTHY SCALES OF CHILDREN'S ABILITIES				
WORD KNOWLEDGE	181	14.5	3.3	6-25
NUMBER QUESTIONS	182	7.6	2.5	0-16
COUNTING & SORTING	182	5.9	2.0	0-9
PICTURE MEMORY	180	3.7	1.4	0-6
DRAW A DESIGN	181	6.4	3.0	1-16
DRAW A CHILD	176	7.8	3.6	0-19
CONCEPTUAL GROUPING	175	6.3	1.8	2-12
LEG COORDINATION	180	10.7	1.4	5-14
DEVELOPMENTAL LEARNING PROGRAM				
LATERALITY	179	13.3	3.0	3-21
BODY AWARENESS	179	13.7	2.1	0-15
KINDERGARTEN DEVELOPMENTAL REVIEW				
TOTAL RISK	182	5.2	3.7	0-18
SELF HELP SKILLS	158	26.1	6.0	10-35
CHILD BEHAVIOR FORM				
TEACHER SUM	189	58.1	9.3	33-83
TEACHER SCALE 1	198	16.9	4.8	8-28
PARENT SUM	132	58.9	9.0	38-83
PARENT SCALE 1	147	10.9	3.3	4-20
PARENT/TEACHER TOTAL SCALE DIFFERENCE	132	27.6	7.1	13-47

TABLE 3. SAMPLE SIZE, MEANS, STANDARD DEVIATIONS AND RANGE FOR ENVIRONMENTAL VARIABLES

ENVIRONMENT VARIABLE	N	MEAN	STD. DEV.	RANGE
PARENT OPINION INVENTORY	142	123.9	19.3	57.0-179
PARENT OPINION INVENTORY PARENT/SCHOOL DIFFERENCE	143	-1.3	19.3	68.1-53.9
PARENT/TEACHER OPINION INVENTORY DIFFERENCE	143	10.8	4.1	2.0-24.6
PARENT/TEACHERS' SCHOOL MEANS DIFFERENCE	143	8.8	3.3	3.5-21.1
SOCIOMETRIC				
SIT/WORK	196	3.8	0.5	2.3-4.9
PLAY	196	3.8	0.6	1.9-5.0
ENVIRONMENT RATING SCALE	9	162.6	26.0	126.5-199
PERSONAL CARE	9	21.1	3.9	16.3-26.5
FURNISHINGS/DISPLAY	9	22.6	3.1	17.5-27.0
LANGUAGE & REASONING	9	19.6	3.0	16.0-25.5
FINE/GROSS MOTOR	9	28.5	5.0	21.0-33.0
CREATIVE ACTIVITIES	9	30.3	4.0	23.0-36.8
SOCIAL DEVELOPMENT	9	24.8	4.7	19.0-32.0
PARENT(S) EDUCATIONAL[a] LEVEL	149	4.9	1.2	2.0-8.0

[a]THIS VARIABLE IS ON A SEVEN POINT SCALE WITH: 2 = BOTH PARENT(S) COMPLETING GRADE SCHOOL, 5 = BOTH PARENT(S) COMPLETING HIGH SCHOOL, 8 = BOTH PARENT(S) COMPLETING COLLEGE.

TABLE 4. SAMPLE SIZE, MEANS, STANDARD DEVIATIONS AND RANGE FOR END-OF-YEAR MEASURES

END OF YEAR MEASURE:	N	MEAN	STD. DEV.	RANGE
COMPETENCY RATING FORM[a]				
MOTOR SKILLS	227	14.7	5.3	5-25
ACADEMIC	227	17.8	7.1	6-30
SOCIAL	227	17.8	5.5	6-30
TEACHER ADAPTIVE	227	20.4	6.7	7-35
KINDERGARTEN REPORT CARD				
PSYSICAL DEVEL.	201	65.9	6.4	42-72
SOCIAL/EMOTIONAL	201	93.2	11.9	62-108
WORK HABITS	201	79.1	10.5	46-90
EXPRESSIVE LANG.	200	98.2	10.9	55-108
POSTTESTS				
MATH OBJECTIVES	195	25.5	4.8	0-29
MATH ITEMS	195	76.6	12.1	0-87
LANG. ARTS OBJ.	223	12.4	3.2	0-15
LANG. ARTS ITM.	223	38.4	7.4	0-45
PARENT COMPENTENCY RATING FORM[a]				
PARENT MOTOR	92	13.5	4.7	5-24
PARENT ACADEMIC	93	16.7	5.8	6-29
PARENT SOCIAL	92	16.5	5.7	6-30
PARENT ADAPTIVE	93	20.0	6.0	8-35

[a]HIGH SCORES INDICATE LOW FUNCTIONING.

complete cases for any particular analysis were used. For example, complete cases for child variables excluding parent ratings is 175, while complete cases including parent ratings drops to a maximum of 132. Therefore, whenever child variables without parent ratings were analyzed a sample size of 175 was used, but if all child variables including parents were analyzed the subject size for that analysis was 132. Sample sizes for most analyses are reported in their accompanying tables.

Reliability Estimates

Reliability estimates were computed for child and environmental measures. The child and environmental variables' internal consistency as measured by Chronbach's Standardized Alpha will be presented first, followed by an estimate of interobserver agreement for the Environment Rating Scale.

Child variables internal reliability. Reliability estimates for the various child variables generally support the internal consistency of these measures. Standardized Alpha coefficients are Alpha reliabilities computed after each item in an observation is standardized by dividing it by its standard deviation, thus assuring item equivalence relative to variability. Kuder-Richardson-20 coefficients, where appropriate for dichotomous scales, were computed. These estimates ranged from .47 on Picture Memory to .92 on Body Awareness with a median of .73 for the 14 scales (see Table 5).

Environmental variables internal consistency. Standardized Alpha coefficients for environmental variables indicate the measures chosen

TABLE 5. INTERNAL RELIABILITY ESTIMATES FOR CHILD VARIABLES

CHILD VARIABLE:	NO. OF ITEMS	STANDARDIZED ALPHA
MCCARTHY SCALES OF CHILDREN'S ABILITIES		
WORD KNOWLEDGE	15	.72
NUMBER QUESTIONS	12	.57[a]
COUNTING & SORTING	9	.71[a]
PICTURE MEMORY	6	.47[a]
DRAW A DESIGN	9	.69
DRAW A CHILD	10	.79
CONCEPTUAL GROUPING	9	.77
LEG COORDINATION	8	.72
DEVELOPMENTAL LEARNING PROGRAM		
LATERALITY	**	**
BODY AWARENESS	15	.92[a]
KINDERGARTEN DEVELOPMENTAL REVIEW		
TOTAL RISK	**	**
SELF HELP SKILLS	7	.76
CHILD BEHAVIOR FORM		
TEACHER SUM	28	.79
TEACHER SCALE 1	7	.82
PARENT SUM	28	.71
PARENT SCALE 1	4	.73
PARENT/TEACHER TOTAL SCALE DIFFERENCE	**	**

[a]KR-20 FORMULA USED FOR DICATOMOUS SCALES

were reliable. Table 6 presents the resulting coefficients for each scale which range from $\alpha = .62$ to $\alpha = .97$ with a median of $\alpha = .78$.

Interobserver agreement. Adequate interobserver reliability was obtained. Using Cronbach's Alpha with raters as variables, interobserver reliability on the Early Childhood Environment Rating Scales ranged from $\alpha = 0.45$ to 1.0 with a median of 0.88, when the measure's items were entered as observations, interrater reliability was consistently .99. A detailed breakdown of interrater reliability estimates are presented for both the 37 individual items and the seven scales for both the first and second observation periods in Table 7.

Child Environmental and End-of-Year Variables Relationships Within Schools and Classes

Three sets of Multiple Analyses of Variance (MANOVA) with school and class nested within schools serving as independent variables were computed for: (1) child variables, (2) environmental variables, and (3) end-of-year measures being used as multiple dependent measures. These analyses were computed to assess similarities and/or differences between schools and classrooms.

MANOVA with child variables. The first MANOVA computed for the child variables revealed no significant differences among schools ($F_{22,242} = 1.4$, $p < .11$), or classrooms ($F_{66,652} = 1.2$, $p < .17$, with either the initial screening battery composed of the McCarthy Scales of Children's Abilities (MSCA) and Developmental Learning Program (DLP), or parent ratings on the Kindergarten Development Review (KDR).

TABLE 6. INTERNAL RELIABILITY FOR ENVIRONMENT VARIABLES AND SCALES

ENVIRONMENT VARIABLE	N	NO. OF ITEMS	ALPHA COEFFICIENT
PARENT OPINION INVENTORY	524	53	.95
TEACHER OPINION INVENTORY	27	64	.94
SCHOOL PROBLEM AREA SURVEY	28	71	.97
STUDENT RELATIONSHIPS	28	6	.75
STUDENT PROBLEMS	28	14	.74
COMMUNITY PROBLEMS	28	9	.89
MY CLASS INVENTORY			
SATISFACTION	435	10	.82
FRICTION	435	10	.73
GOAL DIRECTION	435	10	.62
COMPETITION	435	10	.63
DIFFICULTY	435	10	.53
COHESIVENESS	435	10	.72
EARLY CHILDHOOD ENVIRONMENT RATING SCALE TOTAL	26	37	.96
PERSONAL CARE	26	5	.72
FURNISHINGS/DISPLAY	26	5	.78
LANGUAGE/REASONING	26	4	.86
FINE/GROSS MOTOR	26	6	.82
CREATIVE ACTIVITIES	26	7	.70
SOCIAL DEVELOPMENT	26	5	.82
ADULT PROVISIONS	26	4	**[a]

[a]THIS VARIABLE WAS EXCLUDED FROM THE PRESENT AND SUBSEQUENT ANALYSES DUE TO LACK OF VALIABILITY.

TABLE 7. INTEROBSERVER RELIABILITY COEFFICIENTS COMPUTED WITH CRONBACKS ALPHA FOR THE EARLY CHILDHOOD ENVIRONMENT RATING SCALES' ITEMS AND SCALES

37 INDIVIDUAL ITEMS	RATER	RATER	
TIME 1		1	2
	2	.90	
	3	1.0	.89
TIME 2		4	5
	5	.92	
	5	.87	
	6	.88	.87
	6	.73	
	6	.45	
SEVEN SCALES			
TIME 1		1	2
	2	.99	
	3	1.0	.99
TIME 2		4	5
	5	.99	
	5	.99	
	6	.99	.99
	6	.99	
	6	.99	

A second MANOVA using parent ratings from the Child Behavior Form (CBF) also revealed no significant differences among schools ($F_{4,230} = 0.7$, $p < .74$). Thus children were equivalent in tested abilities and parent ratings across the various settings at the time of school entry. (See Table 8 for further detail.)

A MANOVA computed with the Teacher CBF Sum and Teacher CBF Scale 1 as the dependent measures revealed significant differences across schools ($F_{4,344} = 3.7$, $p < .006$) and classrooms ($F_{12,344} = 4.9$, $p < .0001$).

Since both Teacher CBF scales in combination (i.e., the MANOVA) were significant, it is appropriate to individually examine the separate scales via an Analysis of Variance (ANOVA) using the same combination of independent variables. ANOVA results for the Teacher CBF Sum revealed significant main effects for school ($F_{6,173} = 6.3$, $p < .002$) and for class nested within school ($F_{6,173} = 8.0$, $p < .0001$). Duncan post hoc comparisons indicated the School B teachers, as a group, rated their children as having fewer adaptive or social/emotional risks than teachers from School A or School C ($p < .05$), who rated their children equivalently. The Duncan procedure likewise indicated that Teacher B2 rated her children better than all the other teachers, while Teachers A1 and C3 rated their children similarly to Teachers B1 and A3, but significantly worse than all the other teachers ($p < .05$).

Results from the second ANOVA using the Teacher CBF Scale 1 as the dependent measure yielded a significant effect for the entire

TABLE 8. MULTIPLE ANALYSIS OF VARIANCE FOR CHILD VARIABLES AS DEPENDENT MEASURES

INITIAL SCREENING

OVERALL MODEL: WORD KNOWLEDGE, NUMBER QUESTIONS, COUNTING AND SORTING, PICTURE MEMORY, DRAW A DISIGN, DRAW A CHILD, CONCEPTUAL GROUPING, LEG COORDINATION, LATERALITY, BODY AWARENESS, TOTAL RISK, SELF HELP = SCHOOL SCHOOL(CLASS).

EFFECT	WILKS	F	df	p
SCHOOL	.79	1.4	22,242	.11
SCHOOL(CLASS)	.55	1.2	66,652	.17

PARENT CBF RATINGS

OVERALL MODEL: PARENT CBFSUM, PARENT CBF SCALE 1 = SCHOOL SCHOOL(CLASS)

EFFECT	WILKS	F	df	p
SCHOOL	.96	1.2	4,230	.32
SCHOOL(CLASS)	.93	0.7	12,230	.74

TEACHER CBF RATINGS

OVERALL MODEL: TEACHER CBFSUM, TEACHER CBF SCALE 1 = SCHOOL SCHOOL(CLASS)

EFFECT	WILKS	F	df	p
SCHOOL	.92	3.7	4,344	.006
SCHOOL(CLASS)	.73	4.9	12,344	.0001

INDIVIDUAL SCALES:

	SOURCE	df	MS	F	p
TEACHER CBF SUM	MODEL	8	509	7.6	.0001
	SCHOOL	2		6.3	.002
	SCHOOL(CLASS)	6		8.0	.0001
	ERROR	173	67		
TEACHER CBF SCALE 1	MODEL		46	2.1	.04
	SCHOOL			2.4	.09
	SCHOOL(CLASS)			2.0	.08
	ERROR		22		

DUNCAN'S MULTIPLE RANGE TEST:

	SCHOOL	N	MEANS	GROUPING[a]
TEACHER CBF SUM	A	61	61	X
	C	49	59	X
	B	72	58	X

CLASS	N	MEANS	GROUPING[a]
A1	22	65	P
C3	16	63	P
B1	23	61	P Q
A3	20	60	P Q
B3	26	58	Q
C2	16	57	Q
C1	17	57	Q
A2	19	57	Q
B2	23	48	R

[a]MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT $p < .05$.

model ($F_{8,173}$ = 2.1, $p < .04$), but not for school ($F_{2,173}$ = 2.4, $p < .09$) or class nested within the school ($F_{6,173}$ = 2.0, $p < .08$). Therefore, differential contributions cannot be attributed to either schools or teachers independently from one another. Details of the above results can be found in Table 8.

Thus, MANOVA examining the child variables reveal no differences between schools or classrooms except on teacher ratings completed six to eight weeks into the school year. Teachers within Schools A and C rated their children as having significantly more adaptive and social risks than those in School B. The next section will examine other relationships within schools and classrooms.

MANOVAs with environmental variables. Four MANOVAs were computed for various environmental variable combinations. The first MANOVA, described in Table 9, used the six child level (c.f. method) environmental variables as dependent variables. School and class nested within school were again used as independent measures for all analyses reported in this section. Significant effects for school ($F_{12,198}$ = 8.9, $p < .0001$) and classroom ($F_{36,437}$ = 2.3, $p < .0001$) were observed for the overall model. Subsequent univariate ANOVAs were computed for each dependent variable. Parents from different schools and classrooms had similar perceptions of these respective settings. There were no significant differences found among parent ratings on the POI ($F_{8.104}$ = 1.7, $p < 12$). At the same time nonsignificant differences between parents and a school's teachers' mean ratings for the common items of the POI and TOI ($F_{8,104}$ = 1.1, $p < .38$) were

TABLE 9. MULTIPLE ANALYSES OF VARIANCE FOR ENVIRONMENTAL VARIABLES AS DEPENDENT MEASURES

OVERALL MODEL: POI, POI/TOI, POI/TOIS, SIT, PLAY, SES = SCHOOL SCHOOL(CLASS)

EFFECT	WILKS	F	df	p
SCHOOL	.42	8.9	12,198	.0001
SCHOOL(CLASS)	.46	2.3	36,437	.0001

INDIVIDUAL SCALES ANOVA:

	SOURCE	df	MS	F	p
POI-PARENT OPINION INVENTORY	MODEL	8	550	1.7	.12
	SCHOOL	2		1.2	.32
	SCHOOL(CLASS)	6		2.0	.08
	ERROR	104	334		
POI/TOI-PARENT/TEACHER OPINION INVENTORY DIFFERENCE	MODEL	8	77	6.5	.0001
	SCHOOL	2		12.0	.0001
	SCHOOL(CLASS)	6		3.7	.002
	ERROR	104	12		
POI/TOIS-PARENT/TEACHERS OPINION INVENTORY MEANS DIFFERENCE	MODEL	8	12	1.1	.38
	SCHOOL	2		1.2	.30
	SCHOOL(CLASS)	6		0.8	.61
	ERROR	104	11		
SIT-SIT/WORK SOCIOMETRIC	MODEL	8	.73	2.9	.006
	SCHOOL	2		5.0	.009
	SCHOOL(CLASS)	6		1.8	.10
	ERROR	104	.25		
PLAY-PLAY SOCIOMETRIC	MODEL	8	.91	2.9	.007
	SCHOOL	2		3.1	.05
	SCHOOL(CLASS)	6		2.7	.02
	ERROR	104	.32		
SES-PARENTS EDUCATIONAL LEVEL	MODEL	8	3.0	2.3	.02
	SCHOOL	2		4.3	.01
	SCHOOL(CLASS)	6		1.3	.26
	ERROR	104	1.3		

DUNCAN'S MULTIPLE RANGE TEST:

	SCHOOL	N	MEANS	GROUPING[a]
PARENT/TEACHER OPINION INVENTORY DIFFERENCE	A	39	13.1	D
	B	27	10.3	E
	C	47	9.1	E
SIT/WORK SOCIOMETRIC	A		4.1	F
	C		4.0	F G
	B		3.7	G
PLAY SOCIOMETRIC	C		4.0	H
	A		3.9	H I
	B		3.7	I
PARENTS' EDUCATIONAL LEVEL	B		5.3	J
	C		4.9	J K
	A		4.5	K

	CLASS	N	MEANS	GROUPING[a]
PARENT/TEACHER OPINION INVENTORY DIFFERENCE	A1	15	14.4	L
	A2	16	13.2	L M
	C2	14	11.9	L M N
	C3	7	11.1	L M N O
	A3	8	10.4	M N O
	B3	16	9.3	N O
	B1	15	9.1	O
	B2	16	8.9	O
	C1	6	5.5	P

TABLE 9. (Continued)

DUNCAN'S MULTIPLE RANGE TEST:

	CLASS	N	MEANS	GROUPING[a]
PLAY SOCIOMETRIC	A2		4.3	T
	C3		4.0	T U
	A3		4.0	T U
	C2		4.0	T U
	C1		4.0	T U
	B2		3.8	U
	B1		3.6	U
	B3		3.6	U
	A1		3.5	U

[a]MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT $p < .05$.

established. The faculty as a group and individual parents on common items had similar differences across settings.

Significant differences were found for the remaining four environmental variables. Analysis of difference scores between items common to the Parent Opinion Inventory and Teacher Opinion Inventory revealed significant differences among schools ($\underline{F}_{2,104} = 6.5$, $p < .0001$) and classrooms ($\underline{F}_{6,104} = 3.7$, $p < .002$). Duncan's multiple range test revealed that School A had more differences between parent and kindergarten teacher ratings than either Schools B or C ($p < .05$), which have similar difference scores. When comparing individual classrooms, Duncan's post hoc testing indicated Teachers C1 was most congruent with parents from her classroom, or had the fewest differences, and she was significantly different ($p < .05$) from all other teacher/parent combinations. In fact, Teacher C1 had on the average one half the difference between items as the other two teachers, C2 and C3, in her school. Teachers A1 and A2 had the largest difference scores and were not significantly different from either C2 or C3, but were different from all teachers in School B (see Table 9).

For the Sit/Work Sociometric, the overall model had significant differences ($\underline{F}_{8,104} = 2.9$, $p < .006$) as did the main effect for school ($\underline{F}_{2,104} = 5.0$, $p < .009$), but not class ($\underline{F}_{6,104} = 1.8$, $p < .10$). Duncan post hoc analyses for school effects indicated school B children rated their classmates significantly lower ($p < .05$) on liking to sit and work with their peers than those from Schools A and C.

ANOVA results for the Play Sociometric yielded significant differences for the model ($F_{2,104} = 2.9$, $p < .007$) and the two main effects: School ($F_{2,104} = 3.1$, $p < .05$) and Class ($F_{6,104} = 2.7$, $p < .02$). Children's ratings in Schools C and A are similar as are ratings in Schools A and B, but students as groups are significantly different between School C with the highest rating, and School B with the lowest ratings (Duncan, $p < .05$). Duncan class comparisons expose the finding that classes in both Schools B and C have no significant differences among or between them, but School A has classrooms at both extremes. Class A2 has the highest mean peer ratings while Class A1 is significantly different with the lowest mean peer ratings ($p < .05$) (See Table 9, page 80).

The fourth and last ANOVA explored under this MANOVA used parents' educational level as the dependent variable. Differences among schools ($F_{2,104} = 2.3$, $p < .02$), but not classrooms ($F_{6,104} = 1.3$, $p < .26$) were determined. School B parents had the highest educational level, which was significantly different from School A, which had the lowest (Duncan, $p < .05$). School C was not significantly different from either School B or School A.

In sum, this child level environmental variables MANOVA revealed: (1) no differences among parent opinions of their schools; (2) differences between parents and their child's kindergarten teachers difference scores on common items, but no difference between kindergarten parents and their schools' respective faculty difference scores on those common items; (3) differences among schools and in some

cases classrooms in the strength of peer sociometric ratings; and (4) significant differences between two schools' parents' educational level. To hopefully better understand school differences in teacher ratings found in the above analysis, two MANOVAs of different teaching rating scales will be discussed in the next section.

Teacher scales MANOVAs. Seven independent scales from the School Problem Area Survey which had complete data for most teachers were used as dependent measures in the first one-way MANOVA. "School" was the independent variable. A significant difference among schools was found for the overall model ($F_{14,70} = 2.69$, $p < .003$) as well as for two of its scales: SP1-School Characteristics and Relationships ($F_{2,41} = 10.0$, $p < .0003$) and SP6-School and Community Relationships ($F_{2,41} = 6.7$, $p < .003$). Duncan analyses indicated that for both scales SP1 and SP6 teachers in School B perceive fewer problems (higher means) in these areas than teachers from School A (Duncan, $p < .05$). School C teachers, however, do not rate their school significantly different from either School A or B's teachers. Details of the scales just mentioned, as well as those with no significant differences, are organized in Table 10.

Three complete scales for most of the responding teachers--TO1 Organization and Administration, TO4-School and Community Relationships, and TO5-Teacher Job Satisfaction from the Teacher Opinion Inventory--were used as dependent measures in the second one-way MANOVA. With School as the independent variable, the overall MANOVA reached borderline significance at $p < .10$ ($F_{6,100} = 1.82$). Only TO4-School

TABLE 10. MULTIPLE ANALYSIS OF VARIANCE FOR THE SCHOOL PROBLEM AREA SURVEY

OVERALL MODEL: SP1, SP2, SP3, SP4, SP5, SP6, SP10 = SCHOOL

EFFECT	WILKS	F	df	p
SCHOOL	.42	2.7	14,70	.003

INDIVIDUAL SCALE ANOVA:

	SOURCE	df	MS	F	p
SP1 - SCHOOL CHARACTERISTICS AND RELATIONSHIPS	SCHOOL	2	123	10.1	.0003
	ERROR	41	12		
SP2 - TEACHER/STUDENT RELATIONSHIPS	SCHOOL	2	33	2.7	.08
	ERROR	41	12		
SP3 - TEACHER CHARACTERISTICS AND RELATIONSHIPS	SCHOOL	2	61	2.1	.13
	ERROR	41	29		
SP4 - PRINCIPAL AND STUDENT RELATIONSHIPS	SCHOOL	2	5	.2	.80
	ERROR	41	23		
SP5 - PRINCIPAL AND TEACHER RELATIONSHIPS	SCHOOL	2	34	1.2	.30
	ERROR	41	27		
SP6 - SCHOOL AND COMMUNITY RELATIONSHIPS	SCHOOL	2	139	6.7	.003
	ERROR	41	21		
SP10- FACILITY AND TEACHER PROBLEMS	SCHOOL	2	14	2.0	.15
	ERROR	41	7		

DUNCAN'S MULTIPLE RANGE TEST:

	SCHOOL	N	MEANS	GROUPING[a]
SP1 - SCHOOL CHARACTERISTICS AND RELATIONSHIPS	B	17	27.4	X
	C	10	26.6	X Y
	A	17	24.6	Y
SP6 - SCHOOL AND COMMUNITY RELATIONSHIPS	B	17	27.5	S
	C	10	24.5	S T
	A	17	21.8	T

[a]MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT $p < .05$.

and Community Relationships was found to have significant differences among the three schools ($F_{2,52} = 4.17$, $p < .02$). School B was rated by its teachers as having significantly better School and Community Relationships, or fewer problems in these areas, than either of the other two schools, which were rated equivalently (Duncan, $p < .05$) (See Table 11).

In sum, analyses of both teacher-level rating scales described above revealed differences among schools and their relationships. School B was consistently rated as having better relations than School A and better or the same as those in School C. The reader should also note that these differences parallel those found previously regarding parents' educational level. School B, which had significantly higher parent educational levels, had better teacher ratings regarding community or parental relationships than those from School A.

Teacher and parent perceptions of their respective schools have been examined. A major environmental factor within schools is the students. The next area investigated considered students' perceptions of their schools. As noted earlier, students in the upper grades might be the best perceivers of a school's environmental impact.

Student perceptions on the my class inventory. A MANOVA with the six MCI scales as dependent variables and school and grade nested within schools as independent measures was computed. Significant differences were observed for School ($F_{12,842} = 3.2$, $p < .0002$) and School (Grade) ($F_{36,1851} = 5.2$, $p < .0001$). ANOVAs were then examined for each of the individual scales. For this study, only the main

TABLE 11. MULTIPLE ANALYSES OF VARIANCE FOR THE TEACHER OPINION INVENTORY

OVERALL MODEL: TO1, TO4, TO5, = SCHOOL

EFFECT	WILKS	F	df	p
SCHOOL	.81	1.8	6,100	.10

INDIVIDUAL SCALE ANOVA:

	SOURCE	df	MS	F	p
TO1 - ORGANIZATION AND ADMINISTRATION	SCHOOL	2	9.9	.23	.80
	ERROR	52	43.5		
TO4 - SCHOOL AND COMMUNITY RELATIONSHIPS	SCHOOL	2	21.6	4.2	.02
	ERROR	52	5.2		
TO5 - TEACHER JOB SATISFACTION	SCHOOL	2	3.5	.86	.43
	ERROR	52	4.1		

DUNCAN'S MULTIPLE RANGE TEST:

	SCHOOL	N	MEANS	GROUPING[a]
TO4 - SCHOOL AND COMMUNITY RELATIONSHIPS	A	21	12.0	S
	C	15	11.6	S
	B	19	10.0	D

[a]MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT $p < .05$.

effect "School" will be more fully analyzed. Grade effects are, however, reviewed in Table 12. Results from the ANOVA indicate all full models for each MCI scale are significant at a maximum value of $p < .003$ (See Table 12). Three scales had significant School effects: Satisfaction ($F_{2,426} = 3.9$, $p < .02$), Difficulty ($F_{2,426} = 8.7$, $p < .0002$), and Cohesiveness ($F_{2,426} = 5.4$, $p < .005$). Duncan's Multiple Range Test showed that School C students perceive significantly more satisfaction in their school environment than School A students ($p < .05$). School B students' ratings show no difference between either School C or A on this scale.

Patterns of school differences were found for the Difficulty and Cohesiveness scales. On both of these scales students from School B perceived their environment as significantly more difficult and more cohesive than School A students (Duncan, $p < .05$). School C was not rated differently from either of these schools on these scales. For the other three scales there were no recorded differences between schools on MCI ratings. Thus, students in all schools rated the amount of Friction, how Goal Directed the school is perceived and the Competition among students as being similar. Table 12 provides the particulars for the above analyses.

Student perceptions of their schools are summarized below. From the descriptions above and Table 12, students in School A were more likely to perceive their environment differently from either School B or C students, who typically rated their environment similarly. Students in School A perceived less satisfaction, less cohesiveness, and less difficulty within their school environment. The implications

TABLE 12. MULTIPLE ANALYSES OF VARIANCE FOR THE MY CLASS INVENTORY

OVERALL MODEL: MCI1, MCI2, MCI3, MCI4, MCI5, MCI6 = SCHOOL SCHOOL(GRADE)

EFFECT	WILKS	F	df	p
SCHOOL	.92	3.2	12,842	.0002
SCHOOL(GRADE)	.65	5.2	36,1851	.0001

INDIVIDUAL SCALE ANOVA:

	SOURCE	df	MS	F	p
MCI1 - SATISFACTION	MODEL	8	79.1	6.0	.0001
	SCHOOL	2		3.9	.02
	SCHOOL(GRADE)	6		6.4	.0001
	ERROR	426	13.1		
MCI2 - FRICTION	MODEL	8	252.2	18.9	.0001
	SCHOOL	2		0.4	.69
	SCHOOL(GRADE)	6		24.8	.0001
	ERROR	426	13.3		
MCI3 - GOAL DIRECTION	MODEL	8	24.5	2.9	.003
	SCHOOL	2		1.4	.24
	SCHOOL(GRADE)	6		3.7	.001
	ERROR	426	8.4		
MCI4 - COMPETITION	MODEL	8	24.5	2.9	.003
	SCHOOL	2		1.4	.24
	SCHOOL(GRADE)	6		3.7	.001
	ERROR	426	8.4		
MCI5 - DIFFICULTY	MODEL	8	18.4	2.7	.006
	SCHOOL	2		8.7	.0002
	SCHOOL(GRADE)	6		0.8	.57
	ERROR	426	6.7		
MCI6 - COHESIVENESS	MODEL	8	57.0	5.6	.0001
	SCHOOL	2		5.4	.005
	SCHOOL(GRADE	6		5.3	.0001
	ERROR	426	10.2		

DUNCAN'S MULTIPLE RANGE TEST:

	SCHOOL	N	MEANS	GROUPING[a]
MCI1 - SATISFACTION	C	98	16.5	M
	B	157	15.8	M N
	A	180	15.1	N
MCI5 - DIFFICULTY	B		18.4	Q
	C		17.8	Q R
	A		17.3	R
MCI6 - COHESIVENESS	B		17.0	S
	C		16.5	S T
	A		15.7	T

[a]MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT $p < .05$.

of these results for screening will be discussed later. The last MANOVA will be evaluated next.

MANOVA with end-of-year measures. A final MANOVA was run with seven end-of-year measures as dependent variables. Once again, school and class nested within schools were the main effects. MANOVA results indicated highly significant school ($F_{14,368} = 8.7$, $p < .0001$) and classroom ($F_{42,866} = 5.6$, $p < .0001$) differences when all end-of-year measures were concurrently analyzed. Seven ANOVA followed, one for each end-of-year measure that served as a dependent variable. Only the Social scale from the Teacher Competency Rating Form was found to be statistically nonsignificant ($F_{8,190} = 1.9$, $p < .06$). Of the remaining six scales only Adaptive ($F_{8,190} = 2.2$, $p < .03$) had a probability greater than $p = < .0005$, and four full models were significant at $p < .0001$ (see Table 12). Examination of both school and class as main effects for the six significant models indicated only one main effect from one model (school from the Adaptive scale ANOVA) was non-significant ($F_{2,190} = 2.2$, $p < .11$).

Post hoc analysis of means with Duncan's Multiple Range Test for each main effect followed. Results indicated that School C has significantly higher ratings than either School A or B on the Academic, Expressive Language, Social Emotional, Work Habits, and Language Objectives measures. This is contrary to expected trends as high scores on the Academic scale indicated poorer performance, while high scores on the remaining measures indicated better functioning. Schools B's and A's means have a more consistent pattern. School B has

TABLE 13. MULTIPLE ANALYSES OF VARIANCE WITH END-OF-YEAR MEASURES AS DEPENDENT VARIABLES

OVERALL MODEL: ACADEMIC, SOCIAL, ADAPTIVE, EXPRESSIVE LANGUAGE, SOCIAL/EMOTIONAL, WORK HABITS, LANGUAGE ARTS OBJECTIVES = SCHOOL SCHOOL(CLASS)

EFFECT	WILKS	F	df	p
SCHOOL	.56	8.7	14,368	.0001
SCHOOL(CLASS)	.32	5.6	42,866	.0001

INDIVIDUAL SCALE ANOVA:

	SOURCE	df	MS	F	p
ACADEMIC	MODEL	8	171.2	3.7	.0005
	SCHOOL	2		6.2	.002
	SCHOOL(CLASS)	6		2.9	.01
	ERROR	190	46.4		
SOCIAL	MODEL	8	56.9	1.9	.06
	SCHOOL	2		1.5	.23
	SCHOOL(CLASS)	6		2.1	.05
	ERROR	190	29.9		
ADAPTIVE	MODEL	8	100.9	2.2	.03
	SCHOOL	2		2.2	.11
	SCHOOL(CLASS)	6		2.3	.03
	ERROR	190	44.9		
EXPRESSIVE LANGUAGE	MODEL	8	884.1	10.2	.0001
	SCHOOL	2		24.9	.0001
	SCHOOL(CLASS)	6		4.8	.0001
	ERROR	190	86.4		
SOCIAL/EMOTIONAL	MODEL	8	910.2	8.3	.0001
	SCHOOL	2		10.0	.0001
	SCHOOL(CLASS)	6		7.4	.0001
	ERROR	190	110.0		
WORK HABITS	MODEL	8	1145.5	17.0	.0001
	SCHOOL	2		36.4	.0001
	SCHOOL(CLASS)	6		9.5	.0001
	ERROR	190	67.4		
LANGUAGE OBJECTIVES	MODEL	8	35.3	4.8	.0001
	SCHOOL	2		12.1	.0001
	SCHOOL(CLASS)	6		2.4	.03
	ERROR	190	7.4		

DUNCAN'S MULTIPLE RANGE TEST:

	SCHOOL	N	MEANS	GROUPING
ACADEMIC[b]	C	58	20.1	R
	A	66	17.2	S
	B	75	16.0	S
ADAPTIVE[b]	C		21.8	T
	A		19.9	T
	B		19.6	T
EXPRESSIVE LANGUAGE	C		104.7	U
	B		98.1	V
	A		92.5	W
SOCIAL/EMOTIONAL	C		98.5	Y
	B		91.5	Z
	A		90.4	Z
WORK HABITS	C		86.3	D
	B		78.6	E
	A		73.2	F

TABLE 13. (Continued)

DUNCAN'S MULTIPLE RANGE TEST:	SCHOOL	N	MEANS	GROUPING[a]
LANGUAGE OBJECTIVES	C	58	13.9	G
	B	75	12.6	H
	A	66	11.5	I
	CLASS	**N**	**MEANS**	**GROUPING[a]**
ACADEMIC[b]	C1	19	24.2	X
	A1	23	19.7	Y
	C3	20	18.4	Y Z
	C2	19	17.7	Y Z
	B2	24	17.2	Y Z
	A3	22	16.2	Y Z
	B3	27	16.0	Y Z
	A2	20	15.3	Y Z
	B1	24	14.7	Z
ADAPTIVE[b]	C1		23.9	R
	B3		21.3	S
	C2		21.2	S
	B2		20.9	S
	A3		20.7	S
	A1		20.7	S
	C3		20.4	S T
	A2		18.0	S T
	B1		16.3	T
EXPRESSIVE LANGUAGE	C2		106.1	U
	C1		105.3	U
	C3		102.9	U V
	A2		101.5	U V
	B3		98.3	V
	B1		98.1	V
	B2		97.8	V
	A3		89.7	W
	A1		87.5	W
SOCIAL/EMOTIONAL	C1		99.7	N
	B1		98.9	N
	C2		98.1	N
	C3		97.7	N
	A2		95.6	N
	A3		95.3	N
	B2		88.1	P
	B3		87.8	P
	A1		81.6	Q
WORK HABITS	C3		88.0	L
	C2		85.6	L M
	C1		85.1	L M
	A2		80.7	M N
	B3		80.6	M N
	B1		79.4	N
	A3		76.5	N
	B2		75.5	N
	A1		63.9	O
LANGUAGE OBJECTIVES	C1		14.3	G
	C3		14.0	G
	B1		13.6	G H
	C2		13.5	G H
	B3		13.0	G H I
	A1		12.0	H I J
	A2		11.5	I J
	A3		11.0	J
	B2		11.0	J

[a]MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT $p < .05$.

[b]HIGHER MEANS INDICATE POORER RATINGS

significantly better means than School A on Expressive Language, Work Habits, and Language Objectives (Duncan, $p < .05$). On the remaining measures, Academic and Social/Emotional, School B students are rated better, but not significantly so.

Duncan comparisons among classrooms or teachers will be discussed next. Like those for School, these comparisons are presented in Table 13. As the end-of-year measures (with possible exception of the Languare Arts Objectives) involve scores or grades given by the teacher, they might therefore, be considered teacher ratings. One result from the analyses suggest that teachers have idosyncratic response patterns. Of the nine teachers, teacher C1 rated her class the highest (not always the best) on four of the six significant end-of-year measures and second or third on the two remaining scales. For example, on the Academic and Adaptive scales of the Teacher Competency Rating Form, where a high score suggests poorer performance, class C1 was rated significantly poorer (although they had higher scores) than all other classrooms ($p < .05$). Teacher B1 frequently rated her children better than other teachers rated theirs. On the Academic and Adaptive scales she rated the lowest, or perceived she had the best children. Comparably she rated her children the second best on Social/Emotional (only behind C1) and within the top three on Language Objectives. On two report card scales, Social/Emotional and Work Habits, class A1 had the lowest ratings of all classes. On Expressive Language this class was tied for the lowest with A3 (Duncan, $p < .05$). Classrooms C2 and C3 were always rated the same as were classrooms B2 and B3. Classrooms A2 and A3 were rated the same on five of the measures but not for

Expressive Language. In sum, two of three classrooms in a school were rated similarly, while one classroom per school tended to vary significantly.

Correlations Among Variables

So far specific variables have been described with various statistics: means, standard deviations, minimums, maximums, reliability coefficients, etc. Most recently the study's variables were used as dependent measures within MANOVAs to describe the schools; teachers', and classrooms' characteristics. The child, environmental, and end-of-year variables have been treated as groups and usually independently from one another. As none of these variables exist alone, interrelationships between and among variables will be explored in the following section. Five sets of correlations will be examined: (1) among child variables, (2) among environmental variables, (3) among end-of-year variables, (4) child with environmental variables, and (5) child and environmental variables with end-of-year measures.

Correlations among child variables. The correlations obtained among child variables are presented in Table 14. Relative distinctness of the variables is supported. Other than correlations between McCarthy subtests and a composite sum of seven McCarthy subtests (excluding Leg Coordination), which range from $r = .32$ ($p < .0001$) to $r = .70$ ($p < .0001$), there are eight of 145 correlations among all child variables where $r > .30$; four of those were at $r > .40$.

Few of the highest correlations were unexpected. The McCarthy subtests Number Questions and Counting and Sorting both assess

TABLE 14. PEARSON CORRELATIONS AMONG CHILD VARIABLES

VARIABLES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
MCCARTHY SCALES OF CHILDREN'S ABILITIES SUM	.65[d]	.57[d]	.65[d]	.32[d]	.70[d]	.68[d]	.45[d]	.25[c]	.24[b]	.34[d]	-.23[b]	.14	-.23[b]	.01	.05	-.09	.15
1. WORD KNOWLEDGE	.19[b]																
2. COUNTING AND SORTING	.33[d]	.44[d]															
3. NUMBER QUESTIONS	.19[b]	.05	.18[b]														
4. PICTURE MEMORY	.25[c]	.30[d]	.29[d]	.17[a]													
5. DRAW A DESIGN	.28[d]	.23[b]	.24[c]	.10	.49[d]												
6. DRAW A CHILD	.25[c]	.27[c]	.25[c]	.08	.26[c]	.07											
7. CONCEPTUAL GROUPING	.03	.21[b]	.13	.11	.30[d]	.13	.25[c]										
8. LEG COORDINATION																	
DEVELOPMENTAL LANGUAGE PROGRAM																	
9. LATERALITY	.18[a]	.23[b]	.10	.16[a]	.12	.15	.06	.01									
10. BODY AWARENESS	.21[b]	.28[c]	.23[b]	.29[d]	.12	.24[c]	.06	.13	.35[d]								
KINDERGARTEN DEVELOPMENTAL REVIEW																	
11. TOTAL RISK[e]	-.18[a]	-.09	-.10	-.09	-.29[d]	-.14	-.01	-.10	-.15[a]	-.15[a]							
12. SELF HELP	.00	.06	.05	-.15	.34[d]	.18[a]	-.13	.08	.00	.00	-.15[a]						
CHILD BEHAVIOR FORM																	
13. TEACHER SUM[e]	-.19[a]	-.21[b]	-.16[a]	-.11	-.08	-.24[b]	-.02	-.09	-.10	-.13	.23[b]	.02					
14. TEACHER SCALE 1[e]	-.03	-.09	-.01	-.20[b]	-.06	-.08	-.02	-.01	-.05	.02	.16[a]	.11	.74[d]				
15. PARENT SUM[e]	-.01	-.05	-.04	-.23[b]	-.05	-.15	-.06	-.05	.07	.08	.11	-.22[b]	.10	.13			
16. PARENT SCALE 1[e]	-.14	-.13	-.08	-.01	-.10	-.07	-.01	-.09	-.11	-.04	.17[a]	-.14	.02	-.04	.74[d]		
17. PARENT/TEACHER DIFFERENCE	-.18[a]	-.26[b]	-.31[c]	-.01	-.29[c]	-.18[a]	-.27[b]	-.08	-.14	-.09	-.13	-.22[a]	-.06	.20[a]	.15	.29[c]	

NOTE: ALL CASES WITH BOTH VARIABLES PRESENT FOR EACH CORRELATION WERE USED. THIS RESULTS IN DIFFERENT SIGNIFICANCE LEVELS FOR THE SAME CORRELATIONAL VALUE.

[a] SIGNIFICANT AT THE .05 LEVEL

[b] SIGNIFICANT AT THE .01 LEVEL

[c] SIGNIFICANT AT THE .001 LEVEL

[d] SIGNIFICANT AT THE .0001 LEVEL

[e] HIGH SCORES INDICATE HIGH RISK

quantitative abilities (r = .44, $p < .0001$), while Draw-A-Child and Draw-A-Design are both drawing tasks assessing fine and perceptual motor abilities (r = .49, $p < .0001$). Word Knowledge correlated with Number Questions (r = .33, $p < .0001$) supporting not only their similarity, but also their differences in measuring general cognitive abilities. The highest but least surprising correlations occurred between the teacher or parent CBF 28 item sum with their respectively derived scales, Teacher CBF Scale 1 (r = .74, $p < .0001$) and CBF Parent Scale 1 (r = .74, $p < .0001$). At the same time, however, it should be noted that the correlations between teacher and parent ratings on the same scale (CBF sum) regarding the same children was low and non-significant (r = .10).

Correlations between variables not derived from the same instrument had relatively few high correlations. Only three of 16 Developmental Learning Program (DLP) correlations with the McCarthy subtests reached $p < .001$ and these involved Body Awareness. The highest Body Awareness correlation occurred with Picture Memory (r = .29, $p < .0001$). Not one correlation between any of the McCarthy Subtests and the CBF sums or scales reached significance at $p < .001$ and only four did at $p < .01$. Of these four, two involved Teacher CBF Sum with Count and Sort (r = -.21, $p < .01$) and Draw-A-Child (r = -.24, $p < .01$).

The composite difference score between parents and teachers on the CBF, however, correlated better with more McCarthy subtests than did the other parent or teacher CBF scales. The greater the discrepency between a parent's and a teacher's rating the worse the child tended

to perform on the McCarthy scales. This trend was supported with all McCarthy subtests except for Picture Memory (r = -.01) and Leg Coordination (r = .08).

Two of 16 KDR and McCarthy subtests correlations approached relevant significance. Draw-A-Design correlated with Total Risk (r = -.20, $p < .001$) and Self-Help (r = .34, $p < .0001$). The number of parent reported risks from birth and early developmental history was inversely related to psychomotor drawing abilities. Conversely, the more independence and self-help skills a child was rated as having, the better the assessed psychomotor skills. In other words, the fewer the developmental risks or the greater the self-help skills, the more likely a child would do well on Draw-A-Design.

Correlations among environmental variables. The correlations obtained among environmental variables are presented in Table 15. The first six variables and Parent's Educational Level are unique for each child, while those variables from the Environment Rating Scale are unique for the nine classrooms. Therefore, extreme caution must be used in extrapolating conclusions using the Environment Rating Scale variables to other samples. But, as descriptive statistics these indices are adequate for this data set (Hayes, 1973). Correlations within instruments will be discussed first followed by correlations between instruments.

The POI had four measures derived from it with two high and two moderate correlations between them. There were extremely high correlations between the POI and the POI minus the POI Mean for parents

TABLE 15. PEARSON CORRELATIONS AMONG ENVIRONMENTAL VARIABLES

VARIABLES	1	2	3	4	5	6	7	8	9	10	11	12	13
1. PARENT OPINION INVENTORY (POI)													
2. POI PARENT/SCHOOL DIFFERENCE	.99[d]												
3. PARENT/TEACHER OPINION INVENTORY DIFFERENCE	.10[b]	.01[b]											
4. PARENT/TEACHERS' SCHOOL MEANS DIFFERENCE	.24[d]	.22[d]	.76[d]										
SOCIOMETRIC													
5. SIT/WORK	-.03	-.07	-.03	-.11									
6. PLAY	-.06	-.10	-.07	-.13	.81[d]								
7. ENVIRONMENT RATING SCALE TOTAL	-.11	.02	-.36[d]	-.03	-.13	-.14		.88[de]	.78[de]	.84[de]	.90[de]	.77[de]	.93[de]
8. PERSONAL CARE	-.08	.03	-.34[d]	-.03	-.13	-.09[b]		.59[be]					
9. FURNISHINGS AND DISPLAY	-.13	.00	-.40[d]	-.08	-.24[c]	-.18[b]		.65[ce]	.57[be]				
10. LANGUAGE AND REASONING	-.08	.01	-.27[c]	-.05	-.09	-.09		.81[de]	.63[ce]	.74[de]			
11. FINE / GROSS MOTOR	-.05	.08	-.41[d]	-.03	-.11	-.10		.61[ce]	.47[ae]	.70[de]	.55[be]		
12. CREATIVE ACTIVITIES	-.17[a]	-.10	-.06[b]	.06	.02	-.09		.77[de]	.77[de]	.84[de]	.77[de]	.65[ce]	
13. SOCIAL DEVELOPMENT	-.14	-.04	-.25[b]	.03	-.09	-.08		.77[de]	.77[de]	.84[de]	.77[de]	.65[ce]	
14. PARENTS' EDUCATIONAL LEVEL	.07	.12	-.21[a]	.07	.04	.08	.29[c]	.23[c]	.31[d]	.28[c]	.25[b]	.25[b]	.29[c]

NOTE: ALL CASES WITH BOTH VARIABLES PRESENT FOR EACH CORRELATION WERE USED. THIS RESULTS IN DIFFERENT SIGNIFICANCE LEVELS FOR THE SAME CORRELATIONAL VALUE.

[a] SIGNIFICANT AT .05 LEVEL

[b] SIGNIFICANT AT .01 LEVEL

[c] SIGNIFICANT AT .001 LEVEL

[d] SIGNIFICANT AT .0001 LEVEL

[e] CORRELATION BASED ON N=9

from the parents' school ($r = .99$, $p < .0001$). For the small number of schools in this study, the other parents' ratings had virtually no relative impact on each kindergarten parents' respective score.

When common items between the POI and TOI were compared, results indicated the difference between school means for teachers have more significant relationships ($\underline{r} = .24$, $p < .01$) with the POI than those differences for individual kindergarten teachers ($\underline{r} = .10$, $p =$ ns). The correlation between POI/TOI for kindergarten teachers and POI/TOI for teachers' school means ($\underline{r} = .76$, $p < .0001$) supports the conclusion that differences between kindergarten teachers' perceptions and the remainder of school's faculty exist, but together they account for 58% of common variance.

Kindergarten children tended to rate other kindergarten children similarly on both the sit/work sociometric and the play sociometric ($r = .81$, $p < .0001$). However, differences between these ratings did occur.

The intercorrelation matrix for the Environment Rating Scale and its subscales revealed the scales to be significantly related. Of 21 correlations, 17 were significant at $p < .001$, and 13 of those at $p < .0001$. When the individual scales were correlated with the total scale, the coefficients ranged from $\underline{r} = .77$ to $\underline{r} = .93$ with a medium of $\underline{r} = .86$.

For most variables, correlations between instruments supported the measurement of distinct constructs. Five correlations were above $\underline{r} = \pm .30$ and one of these was above $\underline{r} = \pm .40$. The four most significant correlations, which were all negative, involved the

POI/TOI Kindergarten teacher difference and scales from the Environment Rating Scale. The greater the difference between parents and kindergarten teachers on the common POI/TOI items, the lower the ratings for that room, or conversely, when kindergarten teachers and parents agreed about their children's school environment, the tendency was for that classroom to be rated higher by outside observers.

Parents Educational Level not only involved a significant correlation at $p < .0001$, but also three at $p < .001$, and two at $p < .01$. These significant correlations ranged from $\underline{r} = .23$ to $\underline{r} = .27$, and were with the Environment Rating Scales. As the educational level of parents increased within a class, the outside observers generally rated those classes as having better personal care, better furnishings and displays, better language and reasoning experiences, better fine and gross motor activities and areas, more creative activities, and better social development tasks and interactions. Even though the correlations were small, the results were consistent across the rated scales.

Finally, it should be noted that sociometric ratings were related to any other environmental variable except possibly Furnishings and Displays ($\underline{r} = -.24$, $p < .001$ for Sit/Work and $\underline{r} = .18$, $p < .01$ for Play). This result suggested that those classes who rated their peers higher had less well-cared for equipment and fewer child related and created displays.

Correlations among end-of-year measures. The correlations obtained among end-of-year measures are presented in Table 16.

TABLE 16. PEARSON CORRELATIONS AMONG END-OF-YEAR MEASURES

VARIABLES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
TEACHER COMPETENCY RATING FORM[e]															
1. MOTOR SKILLS															
2. ACADEMIC	.74[d]														
3. SOCIAL	.64[d]	.73[d]													
4. ADAPTIVE	.61[d]	.72[d]	.86[d]												
KINDERGARTEN REPORT CARD															
5. PHYSICAL DEVELOPMENT	-.29[d]	-.13[a]	-.25[c]	-.16[a]											
6. SOCIAL/EMOTIONAL	-.26[c]	-.31[d]	-.36[d]	-.32[d]	.45[d]										
7. WORK HABITS	-.21[b]	-.23[c]	-.24[c]	-.15[a]	.56[d]	.75[d]									
8. EXPRESSIVE LANGUAGE	-.20[b]	-.27[d]	-.26[c]	-.17[a]	.64[d]	.60[d]	.74[d]								
POSTTESTS															
9. MATH OBJECTIVES	-.19[b]	-.29[d]	-.28[c]	-.20[b]	.47[d]	.43[d]	.48[d]	.57[d]							
10. MATH ITEMS	-.21[b]	-.31[d]	-.32[d]	-.25[c]	.44[d]	.42[d]	.47[d]	.57[d]	.95[d]						
11. LANGUAGE ARTS OBJECTIVES	-.21[c]	-.36[d]	-.32[d]	-.32[d]	.43[d]	.55[d]	.60[d]	.67[d]	.78[d]	.78[d]					
12. LANGUAGE ARTS ITEMS	-.22[c]	-.38[d]	-.35[d]	-.27[a]	.37[d]	.46[d]	.46[d]	.54[d]	.74[d]	.74[d]	.89[d]				
PARENT COMPETENCY RATING FORM[e]															
13. MOTOR SKILLS	.02	-.03	-.03	-.01	-.08	-.05	.00	.01	-.01	-.02	-.06[a]	-.11			
14. ACADEMIC	-.08	.11	.06	.11	-.03	-.19	-.14	-.13	-.19	-.17	-.21[a]	-.19	.75[d]		
15. SOCIAL	-.10	-.02	.01	.00	-.03	-.08	.01	.04	-.10	-.14	-.09	-.16	.87[d]	.72[d]	
16. ADAPTIVE	-.09	.01	.01	.07	.00	-.04	.01	.02	-.08	-.08	-.07	-.12	.81[d]	.74[d]	.83[d]

[a] SIGNIFICANT AT THE .05 LEVEL

[b] SIGNIFICANT AT THE .01 LEVEL

[c] SIGNIFICANT AT THE .001 LEVEL

[d] SIGNIFICANT AT THE .0001 LEVEL

[e] HIGH SCORES INDICATE POOR PERFORMANCE

In examining the correlations within instruments or tests, it appears that the relationships within an instrument's scales were usually stronger than those between different instruments or tests whose scales were expected to measure the same skill. For example, the Social scale on the Teacher Competency Rating Form (TCRF) correlated $\underline{r}$ = .64, .73, .86 with Motor, Academic and Adaptive scales respectively of the TCRF, but only $\underline{r}$ = -.36 on the Social/Emotional area of the kindergarten report card, which is conceptually closer. Similarly, other scales from the Teacher Competency Rating, the Kindergarten Report Card and the Parent Competency Rating Form (PCRF) follow this same pattern. One exception to this pattern exists. Performance scores on the Language Arts Post Test correlated as high with all areas of the Kindergarten Report Card as the Report Card did among its own scales.

Between end-of-year instruments, but excluding the Parent Competency Rating Form, those scales that were expected to measure the same skill frequently had the highest correlation when compared with other scales from the second instrument. Once again using the Teacher Competency Rating Social Scale as an example, the reader will recall its correlation with the Report Card's Social/Emotional area ($\underline{r}$ = -.36). Correlations with other Report Card Areas were $\underline{r}$ = -.25, -.24, and -.26 for Physical Development, Work Habits, and Expressive Language universal across scales.

As for the Parent Competency Rating Form (PCRF), there were essentially no significant relationships between its scales and the other end-of-year measures. It is interesting, however, that the

PCRF ratings correlated better with the end-of-year Post Tests than with TCRF ratings, which were derived from exactly the same form! It seems parents were rating student performance, but from a totally different perspective than teachers.

Correlations between child and environment variables. Correlations computed between child and environment variables are presented in Table 17. Considering 222 correlations were computed, only those with $p < .01$ will be considered as having significant results.

Without exception, no significant ($p < .01$) correlations were obtained between any of the four POI derived scores and any of the McCarthy Scales of Children's Abilities (MCSA), the Developmental Learning Program (DLP), or the Kindergarten Developmental Review (KDR). The POI, however, significantly correlated with the Parent CBF Sum ($r = .30$, $p < .01$), and the POI/TOI with the Teacher CBF Sum ($r = .24$, $p < .01$). The correlation between the parent ratings (POI with Parent CBF Sum) indicated that a parent who rated the class or school as performing poorly tended to rate their child as socializing or adapting poorly. The correlation between the POI/TOI Teacher CBF Sum indicated that the more teachers and parents disagree regarding their perceptions of their school the greater the likelihood the teacher would rate the parent's child as socializing or adapting more poorly. In sum, parents' perceptions and parents' and teachers' perception differences of their child's school related to how a child's adaptive/social behavior will be rated.

Unlike the POI the Sociometric ratings had numerous significant correlations with the McCarthy Scales, but no significant

TABLE 17. PEARSON CORRELATIONS BETWEEN CHILD AND ENVIRONMENTAL VARIABLES

	MCCARTHY SCALES OF CHILDREN'S ABILITIES								DLP		KDR		CBF				
VARIABLE	WORD KNOW.	NUM. QUES.	COUNT AND SORT	PICT. MEMORY	DRAW A DESIGN	DRAW-A-CHILD	CONC. GROUP.	LEG	LATER.	BODY AWARE.	TOTAL RISK	SELF HELP	TEACH. SUM	TEACH. 1	PARENT SUM	PARENT 1	PARENT TEACH. DIFF.
PARENT OPINION INVENTORY	.13	.12	.16	.05	.01	-.01	.01	-.02	.02	.06	.04	-.08	.07	.19[a]	.30[b]	.22[a]	.15
PARENT OPINION INVENTORY PARENT/SCHOOL DIFFERENCE	.18[a]	.12	.17[a]	.06	.01	.01	.00	-.03	.04	.09	-.01	-.07	.03	.17[a]	.29[b]	.18[a]	.15
PARENT/TEACHER OPINION INVENTORY DIFFERENCE	-.08	.02	.04	.06	.06	.10	-.06	-.02	-.11	-.03	.08	.07	.24[b]	.20[a]	-.05	-.05	-.01
PARENT/TEACHERS' SCHOOL MEANS DIFFERENCE	-.19[a]	-.07	-.07	-.04	-.04	.04	-.09	.01	.06	-.02	.11	.03	.19[a]	.19[a]	.00	-.13	-.02
SOCIOMETRIC																	
SIT/WORK	.06	.30[d]	.23[b]	-.09	.24[b]	.22[b]	.12	.23[b]	.01	.00	-.07	.05	-.35[d]	-.31[d]	-.05	.05	-.13
PLAY	.15[a]	.30[d]	.24[b]	-.02	.26[c]	.14	.16[a]	.20[b]	.03	.00	-.09	.04	-.35[d]	-.36[d]	-.04	.08	-.12
ENVIRONMENT RATING SCALE	.21[b]	.08	.18[a]	.02	.25[c]	.25[c]	.16[a]	-.06	.19[b]	.23[c]	-.30[d]	.12	-.07	-.11	-.05	.18[a]	-.05
PERSONAL CARE	.19[b]	.10	.18[a]	.02	.24[b]	.25[c]	.14	-.08	.19[b]	.21[b]	-.26[c]	.13	-.02	-.08	-.03	-.16	-.05
FURNISHINGS/DISPLAY	.21[b]	.03	.14	.02	.18[b]	.21[b]	.12	-.06	.17[a]	.14	-.25[b]	.13	-.14	-.13	-.02	-.13	.00
LANGUAGE & REASONING	.18[a]	.10	.15[a]	.09	.19[b]	.14	.21[b]	-.02	.19[b]	.21[b]	-.23[b]	.08	.10	-.05	-.07	-.17[a]	-.10
FINE/GROSS MOTOR	.19[b]	.08	.19[b]	.01	.23[b]	.25[c]	.12	-.07	.18[a]	.25[c]	-.30[d]	.09	-.16[a]	-.15	-.04	-.18[a]	.00
CREATIVE ACTIVITIES	.15	.12	.10	.02	.24[b]	.26[c]	.19[b]	-.04	.14	.23[b]	-.23[b]	.09	.10	-.01	-.04	-.14	-.14
SOCIAL DEVELOPMENT	.19[b]	.12	.16[a]	-.03	.25[c]	.29[c]	.16[a]	-.08	.22[b]	.19[b]	-.21[b]	.16[a]	-.01	-.09	-.01	-.12	-.10
PARENTS' EDUCATIONAL LEVEL	.27[c]	.15	.05	.19[b]	.30[c]	.08	.09	.07	.16[a]	.18[a]	-.24[b]	.19[a]	-.13	-.10	-.04	-.11	-.03

[a]SIGNIFICANT AT THE .05 LEVEL.

[b]SIGNIFICANT AT THE .01 LEVEL.

[c]SIGNIFICANT AT THE .001 LEVEL.

[d]SIGNIFICANT AT THE .0001 LEVEL.

correlations with DLP, KDR, or Parent CBF ratings. Like the POI, sociometric ratings were related to Teacher CBF ratings. (See Table 17.)

In general, the better a child performed on the various cognitive ability tests the higher the peer ratings tended to be. This relationship held true for gross motor abilities too (McCarthy Leg with Sit/Work $\underline{r} = -.23$, $p < .01$, with Play $\underline{r} = .20$, $p < .01$).

The most significant relationships between all child and environment variables occurred between the sociometric ratings and Teacher CBF Sum (Sit/Work, $\underline{r} = -.35$, $p < .0001$; Play $\underline{r} = -.35$, $p < .0001$). These results supported the construct validity of each of these measures. Kindergarten children tended to rate peers socially and adaptively as teachers do or vise versa. The sociometric ratings at the same time did not support the construct validity of the parent CBF scales as measures of social/adaptive behavior ($\underline{r} = .05$ to $-.13$, $p = ns$).

The Environment Rating Scale had numerous significant correlations with the MSCA subtests, the DLP and KDR, but not with any of the CBF scales. Once again the reader should be cautioned in generalizing these results to other samples or assuming the significance levels are accurate. However, the relative strengths among correlations can be interpreted. Of the MSCA subtests, Word Knowledge, DAD, DAC, and Conceptual Grouping are perceptual performance tasks, while Word Knowledge is a verbal task. For all these MSCA subtests a general trend suggested that classrooms with children of higher abilities in the above areas tended to be observed as having better environmental

qualities. This same trend was supported with the DLP results (see Table 17, page 103).

When the KDR Total Risk rating was considered, the highest correlations with the environment ratings were observed. Conceptually this suggested that classrooms with better environment ratings have fewer children with parent described developmental risks. Or, those children with the greatest risks were in classrooms with the poorest environmental resources.

The final environmental feature considered was Parents' Educational Level (PEL). Like the Environment Rating Scale PEL was significant with some scales of every instrument, but not with the CBF. Children's social or adaptive ratings by parents and teachers were unrelated to parents' education. Actual performance by children on certain cognitive abilities tasks were related to PEL. Most significant were correlations between PEL and McCarthy Word Knowledge ($\underline{r}$ = .27, $p < .001$), DAD ($\underline{r}$ = .30, $p < .001$) and KDR Total Risk ($\underline{r}$ = -.24, $p < .01$). Students with higher abilities and fewer risks in the above scales tended to have parents who were better educated.

Summary. Before correlations between child and environmental with end-of-year variables are considered as indices of predictive validity, some of the important conclusions from the correlations described thus far will be briefly summarized. Starting with correlations among child variables and ending with end-of-year measures it was noted that variables or scales from various instruments tended to be more highly correlated with each other than with other

scales from other instruments. There is one notable exception to the trend. Parents and teachers' ratings using the same instruments to rate the same child were unrelated. Perceptions between parents and teachers were consistently different.

Even though teachers and parents rate differently, their combined ratings showed significant relationships with students' performances. Difference scores between teachers and parents on the CBF Sum scores showed that the greater the difference, the greater the likelihood of the child performing poorly on cognitive and motor tasks. When POI and TOI common items were used to produce a composite difference score, this score in relation to classroom observations suggested that agreement between parents and teachers were more likely with classes that have better environmental ratings. This same POI/TOI composite also related to Teacher CBF Sum. The greater the discrepancy between a parent and teachers' perception regarding their class and school the lower a child's adaptive/social rating tended to be. Furthermore, parent ratings seem correlated to other parent ratings even when the constructs were seemingly obtusely connected. For example, parents who rated the school poorly on the POI also tended to rate their own child poorly on the Parent CBF scales.

Another trend involved PEL. Repeatedly, the greater the educational level the fewer the developmental risks, the better the school environment and the higher the students' initial abilities tended to be. With notable exception the CBF scales were uncorrelated with PEL. Combining these conclusions with the apparent reliability noted

previously, the groundwork has been made to assess the predictive validity of the child and environment variables.

The next section will assess the predictive validity of each individual scale via correlations with the end-of-year measures. This will complete the section on correlational analyses.

Correlations Between Child and Environmental Variables with End-Of-Year Measures: Predictive Validity Indices

Correlations obtained between child and environmental variables with end-of-year measures are presented in Table 18. The frequency of significant correlations between the variables and 16 end-of-year measures are summarized in Tables 19 and 20. Considering all 17 child and 14 environment variables, nine child and two environmental variables had more than one half of their 16 correlations with end-of-year measures significant at a maximum of $p < .05$ (See Tables 19 and 20). For the remainder of this general section trends and the most significant and unique variable patterns will be highlighted.

One of the nine most significant child variables mentioned above eight were MSCA subtests and the remaining was the difference score between parents and teachers on the CBF. Five of the McCarthy scales had 10 to 12 of their 16 correlations less than $p < .01$; (1) Number Questions, (2) Counting and Sorting, (3) DAD, (4) DAC, and (5) Conceptual Grouping. The higher the children performed on these two quantitative and three perceptual performance tasks, the higher end-of-year performance ratings. The tasks where these five subtests did not show significance ($p < .01$) were generally restricted to

TABLE 18. PEARSON CORRELATIONS BETWEEN CHILD AND ENVIRONMENTAL VARIABLES WITH END OF YEAR CRITERIA

	TEACHER COMPETENCY RATING FORM				KINDERGARTEN REPORT CARD				POSTTESTS				PARENT COMPETENCY RATING FORM			
VARIABLES	MOTOR	ACADM.	SOCIAL	ADAPT.	PHYS. DEVEL.	SOCIAL EMOT.	WORK HABITS	EXP. LANG.	MATH OBJ.	MATH ITEMS	LANG. OBJ.	LANG. ITEMS	MOTOR	ACADM.	SOCIAL	ADAPT.
MCCARTHY SCALES OF CHILDREN'S ABILITIES																
WORD KNOWLEDGE	-.07	-.17[a]	-.15[a]	-.11	.20[b]	.30[d]	.37[d]	.38[d]	.32[d]	.34[d]	.39[d]	.30[d]	.09	-.10	.10	.05
COUNT AND SORT	-.23[b]	-.27[c]	-.30[d]	-.21[b]	.35[d]	.37[d]	.40[d]	.44[d]	.40[d]	.37[d]	.45[d]	.43[d]	-.03	-.04	.07	.00
NUMBER QUESTIONS	-.13	-.31[d]	-.25[c]	-.21[b]	.27[c]	.35[d]	.31[d]	.40[d]	.39[d]	.40[d]	.37[d]	.38[d]	-.12[a]	-.17	-.12[b]	-.09[b]
PICTURE MEMORY	-.10	-.07	-.08	-.06	.16[a]	.04[a]	.04[a]	.11	.24[b]	.24[b]	.15[a]	.19[b]	.27[a]	.27[a]	.31[b]	.31[b]
DRAW A DESIGN	-.26[c]	-.27[c]	-.32[d]	-.23[b]	.46[d]	.32[d]	.43[d]	.45[d]	.37[d]	.39[d]	.41[d]	.37[d]	-.15	.14	.00	-.03
DRAW A CHILD	-.28[c]	-.26[c]	-.31[d]	-.19[b]	.36[d]	.30[d]	.36[d]	.44[d]	.34[d]	.34[d]	.35[d]	.31[d]	-.02	.00	.09	.10
CONCEPTUAL GROUPING	-.05	-.22[b]	-.19[b]	-.11	.20[b]	.30[d]	.26[c]	.33[d]	.39[d]	.41[d]	.49[d]	.42[d]	-.14	-.25[a]	-.18	-.14
LEG COORDINATION	-.29[d]	-.18[a]	-.17[a]	-.18[a]	.28[c]	.21[c]	.13	.17[a]	.33[d]	.33[d]	.22[b]	.20[b]	.09	.16	.09	.09
DEVELOPMENTAL LANGUAGE PROGRAM																
LATERALITY	-.06	-.12	-.11	-.14	.18[a]	.34[d]	.29[c]	.27[c]	.27[c]	.27[c]	.19[b]	.13[d]	.19	.00	.25[a]	.13
BODY AWARENESS	-.02	-.12	-.10	-.12	.17[a]	.15	.14	.26[c]	.30[c]	.31[d]	.27[c]	.33[d]	.14	.08	.10	.00
KINDERGARTEN DEVELOPMENTAL REVIEW																
TOTAL RISK	.06	.04	.08	.05	-.18[a]	-.10	-.17[a]	-.16[a]	-.22[b]	-.25[b]	-.16[a]	-.15[a]	-.07	-.02	-.12	-.19[b]
SELF-HELP	-.08	.00	-.09	-.05	.31[d]	.12	.19[a]	.20[b]	-.01	.00	.06	.08	-.42[c]	-.36[c]	-.28[a]	-.33[b]
CHILD BEHAVIOR FORM																
TEACHER SUM	.10	.15[a]	.23[b]	.20[b]	-.19[b]	-.38[d]	-.31[d]	-.19[b]	-.08	-.11	-.07	.00	.15	-.08	-.14	-.15
TEACHER SCALE 1	-.04	.08	.16[a]	.18[b]	.04	-.39[d]	-.28[c]	.04	.08	.03	.00	.03	-.13	-.04	-.09	-.16[b]
PARENT SUM	.07	.00	-.04	-.01	.07	.07	-.05	-.02	.12	.13	.00	-.06	.29[a]	.26[a]	.27[a]	.39[b]
PARENT SCALE 1	-.08	.01[b]	-.05[b]	-.07[b]	-.05[b]	.03[b]	-.10	-.15	-.04	-.05	-.13	-.13	.08	.09	.02	.16
PARENT/TEACHER DIFF.	.17	.22[b]	.26[b]	.25[b]	-.24[b]	-.29[b]	-.10	-.33[c]	-.17	-.16	-.43[d]	-.42[d]	.13	.12	.08	.07
PARENT OPINION INVENTORY (POI)	.05	-.04	.09	.08	.14	.06	.07	.09	.15	.11	.12	.08	-.02	.00	.05	-.01
POI/POI SCHOOL DIFFERENCE	-.05	-.04	.10	.09	.14	.07	.10[b]	.12	.18[a]	.15	.15	.07	.02	.01	.09	.02
POI/TOI DIFFERENCE	.06	.03	-.04	-.04	.06	-.21[b]	-.21[b]	-.17[a]	-.07	-.16	-.14	-.01	-.23	-.09	-.28[a]	-.24
POI/TOI SCHOOL DIFF.	.07	.05	.01	.03	.19[a]	-.06	.07	.08	.13	.04	.05	.06	-.13	-.12	-.14	-.09
SOCIOMETRIC																
SIT/WORK	-.17[a]	-.16[a]	-.29[d]	-.20[b]	.39[d]	.38[d]	.27[d]	.30[d]	.22[b]	.21[b]	.23[c]	.24[c]	-.12	-.07	-.18	-.08
PLAY	-.11	-.17[a]	-.21[b]	-.15[a]	.38[d]	.47[d]	.39[d]	.33[d]	.28[c]	.24[c]	.29[d]	.28[d]	-.03	-.07	-.08	.00
ENVIRONMENT RATING SCALE TOTAL	-.03	.00	-.05	-.05	.17[a]	.23[c]	.36[d]	.33[d]	.24[b]	.32[d]	.29[d]	.15[a]	.06	-.04	.07	.09
PERSONAL CARE	.00	.06	.00	.01	.21[b]	.27[d]	.45[d]	.38[d]	.25[c]	.32[d]	.34[d]	.20[b]	.07	-.04	.07	.07
FURNISHINGS/DISPLAY	-.14[a]	-.12	-.08	-.09	.07	.27[c]	.36[d]	.24[c]	.15[a]	.22[b]	.16[a]	-.02	.12	-.02	.15	.15
LANGUAGE/REASONING	.00	.04	-.05	-.08	.10	.26[c]	.24[c]	.23[c]	.26[c]	.34[d]	.33[d]	.25[c]	-.06	-.11	-.07	-.04
FINE/GROSS MOTOR	.01	.07	.01	.03	.23[c]	.20[b]	.39[d]	.39[d]	.25[c]	.32[d]	.29[d]	.13	.11	-.01	.12	.12
CREATIVE ACTIVITIES	.04	.01	-.11	-.10	.09	.09[a]	.09	.18[b]	.20[b]	.28[c]	.27[d]	.26[c]	-.07	-.08	-.07	-.01
SOCIAL DEVELOPMENT	-.07	-.04	-.09	-.10	.16[a]	.32[d]	.40[d]	.33[d]	.18[b]	.24[c]	.27[d]	.15[a]	.04	-.07	.06	.09
PARENTS' EDUCATIONAL LEVEL	-.05	-.15	-.1-	-.16[a]	.16[a]	.22[b]	.18[a]	.21[b]	.16[a]	.18[a]	.19[a]	.15	-.12	-.28[a]	-.12	-.08

[a] $p \leq .05$, [b] $p \leq .01$, [c] $p \leq .001$, [d] $p \leq .0001$

TABLE 19. FREQUENCY OF SIGNIFICANT CORRELATIONS BETWEEN CHILD VARIABLES AND 16 END OF YEAR MEASURES

	PROBABILITY LEVEL				
CHILD VARIABLE:	NS	.05	.01	.001	.0001
MCCARTHY SCALES OF CHILDREN'S ABILITIES					
WORD KNOWLEDGE	6	2	1	0	7
NUMBER QUESTIONS	5	0	1	2	8
COUNTING & SORTING	4	0	2	1	9
PICTURE MEMORY	7	4	5	0	0
DRAW A DESIGN	4	0	1	2	9
DRAW A CHILD	4	0	1	2	9
CONCEPTUAL GROUPING	5	1	3	1	6
LEG COORDINATION	5	4	2	2	3
DEVELOPMENTAL LEARNING PROGRAM					
LATERALITY	8	2	1	4	1
BODY AWARENESS	10	1	0	3	2
KINDERGARTEN DEVELOPMENTAL REVIEW					
TOTAL RISK	9	5	2	0	0
SELF HELP SKILLS	9	2	2	2	1
CHILD BEHAVIOR FORM					
TEACHER SUM	9	1	4	0	2
TEACHER SCALE 1	12	1	1	1	1
PARENT SUM	12	3	1	0	0
PARENT SCALE 1	16	0	0	0	0
PARENT/TEACHER TOTAL SCALE DIFFERENCE	7	1	5	1	2
FREQUENCY TOTAL	132	27	32	21	60

TABLE 20. FREQUENCY OF SIGNIFICANT CORRELATIONS BETWEEN ENVIRONMENT VARIABLES AND 16 END OF YEAR MEASURES

	PROBABILITY LEVEL					
ENVIRONMENT VARIABLE	NS	.05	.01	.001	.0001	
PARENT OPINION INVENTORY	16	0	0	0	0	
PARENT OPINION INVENTORY PARENT/SCHOOL DIFFERENCE	15	1	0	0	0	
PARENT/TEACHER OPINION INVENTORY DIFFERENCE	12	2	2	0	0	
PARENT/TEACHERS' SCHOOL MEANS DIFFERENCE	15	1	0	0	0	
SOCIOMETRIC						
SIT/WORK	4	2	3	2	5	
PLAY	5	2	1	2	6	
ENVIRONMENT RATING SCALE						
TOTAL	8	2	1	1	4	
PERSONAL CARE	8	0	2	1	5	
FURNISHINGS/DISPLAY	9	3	1	2	1	
LANGUAGE & REASONING	9	0	0	5	2	
FINE/GROSS MOTOR	9	0	1	2	4	
CREATIVE ACTIVITIES	11	0	2	2	1	
SOCIAL DEVELOPMENT	8	2	1	1	4	
PARENT(S) EDUCATIONAL LEVEL	9	5	2	0	0	
FREQUENCY TOTAL	138	20	16	18	32	224

Teacher Competency Rating Form Motor Skills (Number Questions and Conceptual Grouping) and the Parent Competency Rating Form, where none of these five child variables were significant!

Picture Memory results from the McCarthy scales had lower correlations than those scales just discussed, but it also had a unique set of correlations with end-of-year measures. First, none of its correlations with the Teacher Competency Rating Form were significant. Second, it had one low significant correlation with the Kindergarten Report Card scales (Physical Development, $r = .16$, $p < .05$). Third, it correlated with both Math $r = .24$, $p < .01$) and Language Arts Objectives ($r = .15$, $p < .05$) and finally, it was the only McCarthy scale to have significant correlations with each of the Parent Competency Rating/Form scales: Motor ($r = .27$, $p < .01$), Academic ($r = .27$, $p < .05$), Social ($r = .31$, $p < .01$), and Adaptive ($r = .31$, $p < .01$)!

Word Knowledge and Leg Coordination, like the highest five McCarthy scales mentioned above, did not have any significant correlations with any of the end-of-year Parent Competency Ratings. Instead of correlating highly with most end-of-year measures these tests were somewhat more selective and discriminating. For example, Word Knowledge had its highest correlations with another verbal task: Report Card Expressive Language ($r = .38$, $p < .0001$), while non-significant or low correlations with motor skills ($r = -.07$, $p = ns$) and the Teacher Competency Adaptive Scale ($r = -.11$, $p = ns$). The Leg Coordination subtest had its highest correlations with Motor Skills ($r = .29$, $p < .0001$) and Physical Development ($r = .28$,

$p < .001$) and its lowest with Work Habits ($r = .13$, p = ns) and academically oriented measures: Academic ($r = -.17$, $p < .05$) and Expressive Language ($r = .17$, $p < .05$).

The Parent/Teacher CBF difference had eight significant ($p < .01$) correlations among the 16 end-of-year measures. Like most of the McCarthy scales, none of these were with any of the Parent Competency Rating Form's scales. Significant results with the CBF difference score indicated that the larger the difference between parents and teachers on the CBF the more likely that the child will perform and be rated poorly at the end of the year. These seems especially true for language oriented skills: CBF Difference score with Report Card Expressive Language ($r = -.33$, $p < .001$), and language arts posttest ($r = -.42$, $p < .0001$).

Other CBF scales have unique sets of correlations. The Teacher CBF Sum and Teacher CBF Scale 1 had the highest correlations of all child variables with the Report Card Social/Emotional scale ($r = -.38$, $p < .0001$ and $r = -.39$, $p < .0001$ respectively). Relatively high correlations similarly resulted on the Report Card Work Habits scale, an adaptive functioning rating ($r = -.31$, $p < .0001$ and $r = -.28$, $p < .001$), and the Teacher Competency Rating Form Social (CBF Sum, $r = .23$, $p < .01$; CBF Scale 1, $r = .16$, $p < .05$), and Adaptive (CBF Sum, $r = .20$, $p < .01$; CBF Scale 1, $r = .18$, $p < .01$) scales. These results supported the teacher CBF scales' discriminant and predictive validity in screening for social and adaptive risk. The lower the risk ratings on the teacher CBF, the higher those children were rated on social and adaptive skills at the end of the year.

Although none of the teacher CBF ratings and only one McCarthy scale (Picture Memory) had significant correlations with the Parent Competency Rating Form, other parent rated performances were significantly related to this end-of-year measure. KDR Self-Help had the following correlations with the Parent Competency Rating Form (PCRF) scales: Motor Skills, $\underline{r} = -.42$, $p < .001$; Academic, $\underline{r} = -.36$, $p < .001$; Social, $\underline{r} = -.28$, $p < .05$; and Adaptive, $\underline{r} = -.33$, $p < .01$. The Parent CBF Sum with the PCRF correlations were: Motor $\underline{r} = .29$, $p < .05$; Academic $\underline{r} = .26$, $p < .05$; Social $\underline{r} = .27$, $p < .05$, and Adaptive, $\underline{r} = .39$, $p < .01$. In sum, the better a parent rated her child at the beginning of the year on social and adaptive behaviors the better he/she was likely to rate her child at the end of the year across most skills.

One area where parents' ratings were better than teachers' ratings, (but not better than individually administered screening tests), was in predicting math posttest performance. The KDR Total Risk scale and math posttest objectives correlated $\underline{r} = -.22$ ($p < .01$). The fewer developmental risks a child was reported to have, the more likely that child performed better on the math posttest. It is interesting to note that Total Risk had no significant ($p < .01$) correlations with any other teacher or parent rated end-of-year measures. In the next section all end-of-year measures will once again be examined, but this time in relation to environmental variables. After that a summary will follow.

As noted earlier, two environmental variables had a majority of their 14 correlations significant ($p < .01$). They were (1) Sit/Work

and (2) Play sociometrics. Sociometric ratings followed the pattern of child tests and teacher ratings by not relating to any end-of-year parent ratings. Their highest correlations with the Teacher Competency Rating Form were with the Report Card Social/Emotional scale (Sit/Play, $\underline{r} = -.29$, $p < .0001$; Play, $\underline{r} = -.21$, $p < .01$) and with the Report Card the Social/Emotional scale, where they had the highest correlations of all child and environmental variables, (Sit/Work, $\underline{r} = .39$, $p < .0001$; Play, $\underline{r} = .47$, $p < .0001$). As a general rule, the sociometric ratings were highly significant ($p < .0001$) with all Report Card scales and moderately significant ($p < .001$) with the posttests. Kindergarten children, who did better in school, tended to get the highest peer ratings. This seemed especially true for end-of-year social ratings.

Of the 12 remaining environment ratings, none significantly ($p < .01$) correlated with any Teacher or Parent Competency Rating form scales. Considering the four POI derived scales, only one, the POI/TOI had any significant correlations with end-of-year measures. POI/TOI had significant correlations with Kindergarten Report Card Social/Emotional ($\underline{r} = -.21$, $p < .01$) and Work Habits ($\underline{r} = -.21$, $p < .01$). The more parents and teachers disagreed on a class and a school's relative quality, the more frequent their children were seen as having more social and adaptive difficulties.

The Environment Rating Scale had numerous significant correlations with the Kindergarten Report Card and posttests. As a final reminder, however, the reader should remember that those children from the same classroom have the same environmental ratings. Therefore, the

significance and generalization of these results are limited and must be interpreted carefully.

Recognizing the above parameters, trends and relationships between Environment Rating Scale and end-of-year measures (report card and posttests) were presented. Four of the six Environment Rating subscales had their highest correlations with Work Habits. These correlations ranged from r = .39 to r = .45. The better a room was rated environmentally the more frequent the children in that room was judged to have satisfactory work habits.

The other two Environment Rating Scales' highest correlations were with the posttests. The Language and Reasoning, and Creative Activities environment rating scales' correlations were with Math Items (r = .34, and r = .28 respectively). As the classes judged quality of language, reasoning and creativeness increased so did students performance on end-of-year posttests. Similarly high correlations with other Environment Rating Scales supported this trend with the possible exception of Furnishings and Display. The cleanliness repair, and amount of furniture along with the quantity and quality of children's displays in the classroom seems minimally related to posttest performance.

The frequency and quality of observed creative classroom activities were unrelated to Report Card ratings on Physical Development (r = .09), Social/Emotional (r = .09), or Work Habit (r = .09) scales. These environmental ratings, at the same time, paralleled their high correlations with posttests performance by correlating with the more academic Expressive Language scale (r = .18).

One of the report card measures, Physical Development, had the fewest (two) relatively high correlations with the Environment Rating Scales. The scales correlating highest with Physical Development were Personal Care (r = .21) and Fine/Gross Motor activities (r = .23). Classrooms with higher observer ratings on personal care and motor activities had students with more satisfactory physical development ratings.

Summary. A brief summary will conclude this section. The 31 variables used in this study varied as to which end-of-year measures they predicted. As a group those from the MSCA, Parent/Teacher CBF Difference, and the Sociometric Ratings had the most consistent and most significant predictive validity with the Teacher Competency Rating Form, Kindergarten report card, and posttests. When end-of-year parent competency ratings were used as the predictive criterion, the above scales with the exception of Picture Memory showed no predictive validity. Parent ranges from the KDR and CBF, however, had significant correlations with the parent competency ratings.

While some variables had global predictive validity across numerous criteria, others were more selective. The teacher CBF scales had their highest correlations with social and adaptive measures. KDR Total Risk related significantly with math posttest results. POI/TOI was inversely related to two report card areas. And, the Environment Rating Scales as a set had repeated seemingly important relationship with the report card scales and posttests.

Other variables showed few significant predictive relationships. For example Parent CBF Scale 1, the Parent Opinion Inventory, the Parent/School means Opinion Inventory Difference, and the Parent/Teachers school means Inventory Difference had no significant ($p < .01$) relationships with any of the 16 criterion scales.

The previous sections have generally described and explored single and dyadic relationships. In the following sections variable combinations were used to predict end-of-year success in four areas: (1) Academic, (2) Social, (3) Adaptive, and (4) Overall functioning. Discriminant analysis was the statistical tool.

Discriminant Analysis

From single variable relationships and correlations, this last set of analyses employed discriminant function analysis to discover multiple variable relationships in predicting specific functioning groups for each subject. Before reporting the discriminant analysis results, the method of determining the criterion groups for this study will be presented.

For this study three sets of end-of-year measures were used to develop the criterion measures: Teacher Competency Rating Form, report card, and posttest results. Parent Competency Ratings were not used for two reasons: (1) 92 usable forms were returned, which reduced the subject pool to where the analysis could not be justified, (2) from the preliminary correlational results indicated these ratings did not relate to the schools' criteria for success.

From the three sets of end-of-year measures mentioned above four functioning areas resulted. The functioning areas, names and

contributing criterion variables included: (1) Academic Total--Teacher Competency Rating Form, Academic; report card, Expressive Language; and posttest, Language Arts Objectives; (2) Social Total--Teacher Competency Rating, Social; report card, Social/Emotional; (3) Adaptive Total--Teacher Competency Rating, Adaptive; report card, Work Habits; (4) Overall--a composite of the three academic, two social, and two adaptive scales listed. In the preliminary design of this study a math posttest measure was to be used as part of the Academic Total functioning area. Because all the of Class B2's math posttests were incomplete, the reduction in sample size precluded its use.

As the criterion variables composing the functioning areas were on different scales, scale transformations were necessary. Each student for the seven criterion variables was ranked into thirds by classroom. Those students in the lowest third were given rank 1, in the middle 2, and those with the best performance 3. Classroom was used as the ranking unit because the preliminary MANOVA results indicated that some teachers had idosyncratic rating patterns.

After each kindergarten student was ranked for every criterion variable independently (7 ranks), the criterion variables for each functioning area were determined by finding the mean of the ranks and placing that student at the level of his mean ranking. For example, a student with ranks on the Total Academic criterion variables of 1, 1, 2 would have a mean rank of 1.3 and be placed in level 1. Or ranks 2, 1, 2 would have a mean rank of 1.6 and that student would be placed in level 2. If a set of ranks had means between 1.5 to 2.5 inclusive the student was placed in level 2. Prior probabilities

for the four areas for each set of predictor variables are presented in Table 21.

The four functioning area with their low, middle, and high criterion groupings were used with three combinations of predictor variables: (1) child variables, (2) environment variables, and (3) child and environment variables, in 12 stepwise descriminant analyses. As always only cases with no missing predictor variables for that analysis were used. After deleting those cases with missing variables, complete cases for the various analyses ranged from 85 to 196 with a median of 110. In all analyses the sample size exceeded Tatsuoka's (1970) recommendation of two to three subjects per predictor variable and Philpot's (1982) recommendation of $N = 2(p+k-1)+25$, where p = number of predictor variables and k = number of levels.

Variables were entered into all discriminant functions after meeting the criterion of minimizing Wilks' lambda for that function. This multivariate test evaluates the difference between mean vectors or group centroids between the three levels or groups. As this test is analogous to an F test or Chi Square test in a univariate population, equivalent F tests or Chi Square tests as well as their significance levels can be computed. In this study a Chi Square equivalent to Wilks' lambda was used to test for equal group centroids for the two discriminant functions computed for each analysis.

The entrance and/or removal of variables in the present study were governed by the variable's individual partial F ratio. The more a variable increased the separation among group centroids compared with those variables already entered the higher the partial F and the

TABLE 21. PRIOR PROBABILITIES FOR FUNCTIONING AREAS BY FUNCTIONING LEVELS

	LEVELS		
FUNCTIONING AREA	LOW	MIDDLE	HIGH
ACADEMIC			
CHILD VARIABLES	.222	.482	.296
ENVIRONMENT VARIABLES	.186	.513	.301
CHILD & ENVIRON'T VAR.	.169	.506	.325
SOCIAL			
CHILD VARIABLES	.130	.694	.176
ENVIRONMENT VARIABLES	.124	.681	.195
CHILD & ENVIRON'T VAR.	.119	.706	.174
ADAPTIVE			
CHILD VARIABLES	.157	.630	.213
ENVIRONMENT VARIABLES	.150	.637	.212
CHILD & ENVIRON'T VAR.	.165	.614	.220
OVERALL			
CHILD VARIABLES	.167	.537	.296
ENVIRONMENT VARIABLES	.141	.566	.292
CHILD & ENVIRON'T VAR.	.116	.558	.326

variable with the highest partial F was entered. After a variable was entered the next step in the analysis was to determine if other variables already entered in the study continued to assist in discriminating among the centroids. If a variable assisted less with the discrimination, its partial F drops. When a variable's F dropped too far, it was removed. The minimum F values to enter or remove a variable were both set at 1.0 for this study.

Another critical assumption in analyzing discriminant function analyses is that groups covariance matrices are equal. If the covariance matrices are not equal, the classification results determined by the computed discriminating variables is open to question. The Box's M test (Cooley & Lohnes, 1971) makes such a determination and was performed on every analysis. A Box's M test was considered significant when covariance matrices were different at $p < .001$. Philpot (1982) reported the power of discriminant analysis is adequate to assume equal covariance matrices above this level.

If group covariance matrices are not equal, classification results are not lost. A jackknifed classification procedure (Lachenbrunch & Mickey, 1968) can be employed. This method removes each subject, one at a time, and computes from the remaining sample (N-1) the discriminant function without that subject. The single case is then classified on the basis of the newly computed discriminant values. This procedure reduces the bias of classification estimation from $1/N$ to $1/N^2$ (Cochran, 1968) or basically gives an unbiased classification without assuming equal groups' covariance matices.

All analyses where the Box's M test was significant the jackknife procedure was used in the classification procedure.

In all classification procedures, functioning level prior probabilities were used in making Bayesian adjustment to group membership. This provides a most rigorous set of prediction conditions. Prior probabilities are presented in Table 21, page 121.

After these tests and assumptions have been met, the prediction of group membership from a set of variables is possible. The distinctness of individual groups, and the contributing power of individual variables, will be presented for the child, followed by the environmental and finally by a combination of child and environmental variables. Subsequent to these findings, individual classification results for each functioning area will conclude this section.

Child Variables

Group centroids and the significance tests for the equality of group centroids are presented in Table 22. Examination of these results indicate the group centroids were clearly different, or the child variables clearly differentiated between low, middle, and high end-of-year levels for each functioning area.

The standardized canonical discriminant function coefficients for child variables are displayed in Table 23. These values represent the relative strength each variable contributes to the various significant functions. Frequently, these scores are considered analogous to beta weights from regression analysis. Tatsuoka (1970) has indicated that the coefficient's sign suggests the direction the predictor variables are making their contribution. Variables with positive coefficients

TABLE 22. GROUP CENTROIDS AND SIGNIFICANCE TESTS FOR THE EQUALITY OF GROUP CENTROIDS BY FUNCTIONING AREA FOR MODELS USING CHILD VARIABLES

	GROUP CENTROIDS						
FUNCTIONING AREA	LOW	MIDDLE	HIGH	WILK'S LAMDA	CHI-SQ	df	p
ACADEMIC							
WHOLE MODEL	-1.35	-0.17	1.29	0.41	87.8	26	.0001
MODEL WITHOUT 1ST FUNCT.	-0.61	0.51	-0.37	0.80	22.5	12	.05
SOCIAL							
WHOLE MODEL	-1.75	-0.07	1.56	0.42	86.8	24	.0001
MODEL WITHOUT 1ST FUNCT.	-0.93	.35	-0.71	0.77	25.6	11	.01
ADAPTIVE							
WHOLE MODEL	-1.47	-0.00	1.10	0.53	64.03	20	.0001
MODEL WITHOUT 1ST FUNCT.	-0.54	0.31	-0.53	0.85	16.04	9	ns
OVERALL							
WHOLE MODEL	-1.63	-0.21	1.30	0.43	84.93	22	.0001
MODEL WITHOUT 1ST FUNCT.	-0.60	0.36	-0.32	0.86	15.44	10	ns

TABLE 23. STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS FOR FUNCTIONING AREA USING CHILD VARIABLES

	FUNCTIONING AREA							
CHILD VARIABLE:	ACADEMIC		SOCIAL		ADAPTIVE		OVERALL	
FUNCTION	1	2	1	2	1	2	1	2
MCCARTHY SCALES OF CHILDREN'S ABILIEIES								
WORD KNOWLEDGE	0.08	-0.44						
NUMBER QUESTIONS	0.53	0.55	.44	.15	.38	**	.48	**
COUNTING & SORTING	0.15	-0.50	--		.20	**	.38	**
PICTURE MEMORY	0.28	-0.30						
DRAW A DESIGN	-0.29	0.20	.20	-.36				
DRAW A CHILD	0.69	0.38	.40	.25	.40	**	.42	**
CONCEPTUAL GROUPING	0.19	0.21	0.18	0.29				
LEG COORDINATION	0.22	0.15	.37	.39	.56	**		
DEVELOPMENTAL LEARNING PROGRAM								
LATERALITY			.28	.18	.26	**	.32	**
BODY AWARENESS	-0.55	-0.00	-.53	.25	-.34	**	-.56	**
KINDERGARTEN DEVELOPMENTAL REVIEW								
TOTAL RISK	-0.36	-0.10	-.21	.27	-.29	**	-.24	**
SELF HELP SKILLS			-.04	-.38	.11	**	-.09	**
CHILD BEHAVIOR FORM								
TEACHER SUM	-0.13	0.72					-.29	**
TEACHER SCALE 1			-.56	.29	.41	**		
PARENT SUM								
PARENT SCALE 1	-0.21	0.23	.20	.38	.14	**	.01	**
PARENT/TEACHER TOTAL SCALE DIFFERENCE	-0.24	0.04	-.29	.26			-.15	**

describe the groups having the higher group centroids, while those with negative coefficients describe those with the lower group centroid.

As there were three groups two discriminant functions were possible. If significant, the second function added an orthogonal dimension by which to ascertain the predictor variables contributions. Variable contributions for each functioning area were explored.

Academic. Thirteen of 17 child variables helped in discriminating this area. Academically competent children did well on Number Questions and DAC, as these tests contributed most to differentiating the high from middle and low groups. Performance on Body Awareness, KDR Total Task, DAD, and the CBF scales were more descriptive of the low group and assisted in determining children with potential academic risk. The middle academic group was best differentiated from the low and high groups by Teacher CBF Sum, Number Questions, and Counting and Sorting.

Social. Twelve child variables contributed to discriminating the groups in this area. Number Questions and DAC again discriminated the high group from the low group, but so did Leg Coordination. Socially adept children performed differentially better on the cognitive tasks, but also with motor skills. The socially low group was differentiated from the higher groups with Teacher CBF Scale 1, which describes an acting out child, and Body Awareness, which assesses knowledge of body parts. No tests individually differentiated the middle group from the extremes.

Adaptive. One discriminant function composed of 10 variables was this analysis' results. For this area Leg Coordination was the single most important variable, and in combination with DAC and Number Questions contributed most in describing the adaptively high group. Similarly to the Social area ratings, Teacher CBF Scale 1 and performance on Body Awareness differentiated the low group, but so did the KDR Total Risk.

Overall. In predicting academic, social, and adaptive school success combined, three variables: Number Questions, Counting and Sorting and DAC best differentiated the high from the middle and low groups, and three variables: Body Awareness, KDR Total Risk, and Teacher CBF Sum, best differentiated the low from the middle and high groups. Once again the middle group had no variable distinctively differentiating it from the other groups.

Summary. Five child variables: Number Questions, DAC, Body Awareness, KDR Total Risk, and Parent CBF Scale 1 consistently contributed to the discriminant functions for the four functioning areas. Only one scale, Parent CBF Sum, was not included on any function and two scales, Word Knowledge an Picture Memory, helped maximize discrimination between groups for only one functioning area. The remaining scales provided unique information to the analyses on two or three occasions.

Environment Variables

Group centroids for environment variables and their significance tests for equality are presented in Table 24. Low, middle, and high

TABLE 24. GROUP CENTROIDS AND SIGNIFICANCE TESTS FOR THE EQUALITY OF GROUP CENTROIDS BY FUNCTIONING AREA FOR MODELS USING ENVIRONMENTAL VARIABLES

	GROUP CENTROIDS						
FUNCTIONING AREA	LOW	MIDDLE	HIGH	WILK'S LAMDA	CHI-SQ	DF	P<
ACADEMIC							
WHOLE MODEL	-0.16	-0.39	0.76	.71	36.9	10	.0001
MODEL WITHOUT 1ST FUNCT.	-0.69	0.20	0.08	.90	11.7	4	.05
SOCIAL							
WHOLE MODEL	-1.34	-.03	0.95	.59	56.1	12	.0001
MODEL WITHOUT 1ST FUNCT.	0.70	-.30	0.60	.84	19.2	5	.01
ADAPTIVE							
WHOLE MODEL	.73	-.11	.86	.73	34.85	8	.0001
MODEL WITHOUT 1ST FUNCT.	.58	-.22	.26	.91	10.39	3	.05
OVERALL							
WHOLE MODEL	-0.34	-0.37	0.87	.63	50.8	8	.0001
MODEL WITHOUT 1ST FUNCT.	1.07	-0.26	-0.01	.83	20.5	3	.0001

groups were significantly different ($p < .0001$) for each functioning area, when environmental variables' mean vectors were used in predicting end-of-year levels.

The standardized canonical discriminant function coefficients for each functioning area are recorded on Table 25. Less than one half of the 14 environmental variables were used in each of these discriminant analyses. The variables predicting each functioning area will be presented.

Academic. Five variables produced the best linear combination to predict end-of-year success. A class's rating on Furnishings and Display assisted most in distinquishing the high level group from the middle and low. As the middle group had the lowest group centroid on the first function and was relatively close to the low group, the strong negative loading on a class's Social Development ratings indicated its power in discriminating between the middle and low levels with the high.

The second function's coefficients contributed more information to what variables separated the low level group from the middle and high groups. Poor Social Development ratings were descriptive of the low group, while high Language & Reasoning and Sit/Work Sociometric ratings were descriptive of the upper level groups.

Social. Six variables discriminated the levels in this area. Three variables: Sit/Work sociometric, Furnishings & Display, and Language & Reasoning provided discriminating power for the high level and one variable, Social Development, the power for the low level.

TABLE 25. STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS FOR FUNCTIONING AREA USING ENVIRONMENTAL VARIABLES

	FUNCTIONING AREA							
ENVIRONMENT VARIABLE	ACADEMIC		SOCIAL		ADAPTIVE		OVERALL	
FUNCTION	1	2	1	2	1	2	1	2
PARENT OPINION INVENTORY								
PARENT OPINION INVENTORY PARENT/SCHOOL DIFFERENCE							0.18	0.38
PARENT/TEACHER OPINION INVENTORY DIFFERENCE								
PARENT/TEACHERS' SCHOOL MEANS DIFFERENCE								
SOCIOMETRIC								
SIT/WORK	0.44	0.87	1.11	-0.06	.78	-.42	0.74	-0.66
PLAY								
ENVIRONMENT RATING SCALE								
PERSONAL CARE			0.47	2.26	-1.62	-.31		
FURNISHINGS/DISPLAY	1.27	0.44	1.21	1.01	1.30	1.12	1.36	0.79
LANGUAGE & REASONING	0.29	1.43	0.87	-0.48	.65	-.09		
FINE/GROSS MOTOR			-0.61	-2.46			-0.58	-0.23
CREATIVE ACTIVITIES								
SOCIAL DEVELOPMENT	-.92	-1.64	-1.58	0.10				
PARENT(S) EDUCATIONAL LEVEL	0.51	-0.31						

From the second function the coefficients indicate Fine/Gross motor ratings distinguished the middle from the extreme groups best.

Adaptive. Four variables: Sit/Work sociometric, Personal Care, Furnishings and Display, and Language and Reasoning provided the information needed to discriminate the three adaptive levels. As this discriminant function variable set was small (four predictor variables), and the variables alone did not clearly distinguish between groups, conclusions regarding variables and the specific groups they predict were unwarranted.

Overall. Classification accuracy for this area was maximized. through four variables: Parent Opinion Inventory/Parent School means difference, Sit/Work sociometric, Furnishings and Display and Fine/Gross motor ratings. Once again, specific conclusions regarding power of certain variables was unwarranted.

Summary. Two environment variables: Sit/Work sociometric and Furnishings and Display consistently helped maximize group differences across functioning areas. Only one POI scale for one functioning area predicted end-of-year groups, and its contribution was negligible. Similarly, PEL provided relatively little discriminating power. The Environment Rating scale on the other hand not only contained one scale that discriminated across all functioning areas, but also multiple scales assisting in maximizing group differences with two or three functioning areas.

In the four child and environment discriminant analyses to be presented in the following section a reduction in predictor variables

was required to exceed the recommended number of complete cases per variable. To do this the six individual Environment Rating Scales' subscales were summed according to its manual to give a general environmental rating. This reduced the total number of variables from 30 to 25.

Child and Environment Variables

Group centroids and their significance tests for equality are presented in Table 26. All first functions, or whole model discriminant functions, significantly discriminated among group centroids. Therefore, mean vectors created by child and environment predictor variables for the three end-of-year levels are quantitatively different and further analysis was indicated.

Table 27 shows the standardized discriminant function coefficients for each included variable for every functioning area analysis. As before, each functioning area results follow.

Academic. In this area eight child and three environment variables were included in the discriminant function. DAC results discriminately classified those in the high group best, while Teacher CBF Sum and Sit/Work sociometric did so for the middle level group and Body Awareness and KDR Total Risk for the low group. PEL contributed discriminating power between the low and middle levels.

Social. Seven child and three environment variables composed this discriminant function. Overall high social functioning are discriminately characterized by the Sit/Work sociometric ratings, and performance on Counting and Sorting along with DAC. At the other extreme, low level

TABLE 26. GROUP CENTROIDS AND SIGNIFICANCE TESTS FOR THE EQUALITY OF GROUP CENTROIDS BY FUNCTIONING AREA FOR MODELS USING CHILD AND ENVIRONMENTAL VARIABLES

	GROUP CENTROIDS						
FUNCTIONING AREA	LOW	MIDDLE	HIGH	WILK'S LAMDA	CHI-SQ	df	p<
ACADEMIC							
WHOLE MODEL	1.28	.46	-1.38	.33	83.3	22	.0001
MODEL WITHOUT 1ST FUNCT.	-1.25	.60	-.29	.67	29.9	10	.001
SOCIAL							
WHOLE MODEL	-2.00	-0.05	1.56	.40	93.2	20	.0001
MODEL WITHOUT 1ST FUNCT.	-0.92	.35	-0.77	.77	26.4	9	.001
ADAPTIVE							
WHOLE MODEL	-1.47	-.03	1.18	.51	67.5	24	.0001
MODEL WITHOUT 1ST FUNCT.	-.53	.32	-.48	.86	15.9	11	ns
OVERALL							
WHOLE MODEL	-1.66	-0.34	1.18	.35	83.0	18	.0001
1ST FUNCT.	-1.48	0.57	-0.46	.65	33.4	8	.0001

TABLE 27. STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS FOR FUNCTIONING AREA USING CHILD AND ENVIRONMENTAL VARIABLES

	FUNCTIONING AREA							
CHILD VARIABLE:	ACADEMIC		SOCIAL		ADAPTIVE		OVERALL	
FUNCTION	1	2	1	2	1	2	1	2
MCCARTHY SCALES OF CHILDREN'S ABILITIES								
WORD KNOWLEDGE	-.32	-.24			.28	**	.40	.19
NUMBER QUESTIONS	-.35	.40						
COUNTING & SORTING			.47	.19			.59	.04
PICTURE MEMORY					.28	**		
DRAW A DESIGN								
DRAW A CHILD	-.78	.35	.41	.11	.40	**	.40	.25
CONCEPTUAL GROUPING								
LEG COORDINATION					.52	**		
DEVELOPMENTAL LEARNING PROGRAM								
LATERALITY								
BODY AWARENESS	.42	-.30	-.34	.53	-.25	**	-.34	.04
KINDERGARTEN DEVELOPMENTAL REVIEW								
TOTAL RISK	.35	-.18	-.30	.24	-.31	**		
SELF HELP SKILLS			-.21	-.53	.21	**		
CHILD BEHAVIOR FORM								
TEACHER SUM	.16	.87			-.50	**	-.20	.49
TEACHER SCALE 1			-.21	.43				
PARENT SUM					.07	**	-.24	.43
PARENT SCALE 1	.28	.08						
PARENT/TEACHER TOTAL SCALE DIFFERENCE	.34	.04	-.20	.45	.17	**		
PARENT OPINION INVENTORY								
PARENT OPINION INVENTORY PARENT/SCHOOL DIFFERENCE								
PARENT/TEACHER OPINION INVENTORY DIFFERENCE								
PARENT/TEACHERS' SCHOOL MEANS DIFFERENCE	.28	-.28						
SOCIOMETRIC								
SIT/WORK	.15	.44	.60	.31	.26	**	.41	.34
PLAY								
ENVIRONMENT RATING SCALE			.01	-.38	-.10	**	.19	.84
PERSONAL CARE								
FURNISHINGS/DISPLAY								
LANGUAGE & REASONING								
FINE/GROSS MOTOR								
CREATIVE ACTIVITIES								
SOCIAL DEVELOPMENT								
PARENT(S) EDUCATIONAL LEVEL	-.21	-.46	-.35	.04				
SCHOOL								

functioning was classified best with a combination of ratings: KDR Total Risk, KDR Self Help Skills, Teacher CBF Scale 1, and CBF Parent/Teacher Total Scale Difference. Middle group students were more easily distinguished from the low than high group. The variable combination that accomplished this included: Body Awareness, Teacher CBF Scale 1, CBF Parent/Teacher difference, and Sit/Work sociometric.

Adaptive. In this functioning area 12 variables, 10 child and two environment, in combination along a single dimension discriminated among the three levels. The high functioning group performed better on Leg Coordination and DAC. The low group was classified best with poor ratings on Teacher CBF Sum, KDR Total Risk, and Body Awareness. In general, the middle group classification was between the extremes on all measures.

Overall. The fewest variables (9) were used to discriminate between groups for this composite area. The child variables included: Word Knowledge, Counting and Sorting, DAC, Body Awareness, Teacher CBF Sum, and Parent CBF Sum; and the environment variables included: POI, Sit/Work sociometric, and the Environment Rating Scale Total. The first discriminant function distinguishes best between the high and low levels, while the second function did so between the middle and low. High overall functioning was distinguished best from low and middle functioning with Counting and Sorting, Sit/Work sociometric, Word Knowledge, and DAC and low functioning from high and middle with Body Awareness, Parent CBF Sum, and Teacher CBF Sum.

Variables distinguishing middle from high and also low were Environmental Rating, Teacher CBF Sum, and Parent CBF Sum.

Summary. Repeatedly the high group was discriminated by high performance on the McCarthy scales while low performance was best discriminated by poor performance on Body Awareness, and CBF scales. Three variables: DAC, Body Awareness, and Sit/Work sociometric, contributed to discriminating the group levels across all functioning areas. While all but the Parent CBF Sum contributed to at least one discriminant function, when child variables were considered alone, three variables: DAD, Conceptual Grouping, and Laterality failed to enter analyses when both child and environmental variables were available. Considering the remaining environment variables, the POI scales were entered once, PEL twice, the Environment Rating Scale Total three times. Needless to say, the POI and its derived scales were not predictive of end-of-year school success.

Actual success of predictor variables can not be assumed by highly significantly different group centroids nor the relative discriminating power of individual variables. The real test for prediction is the accurate classification of students. The next section will address this issue by considering the prediction performance classification matrices for each of the 12 discriminant analyses described previously.

Classification Results

The classification tables for each functioning area are presented as follows: Table 28--Academic, Table 29--Social, Table 30--Adaptive,

TABLE 28. CLASSIFICATION RESULTS FOR ACADEMIC FUNCTIONING WITH BAYESIAN CORRECTION FOR UNEQUAL PRIOR PROBABILITIES

	Actual[a,b] Group	N OF CASES	PREDICTED GROUP LOW	MIDDLE	HIGH
CHILD VARIABLE: 13.					
	LOW	24	14 58%(5)	8 33%	2 8%
	MIDDLE	54	6 11%	40 74%(23)	8 15%
	HIGH	32	1 3%	7 22%	24 75%(9)
TOTAL CASES CORRECTLY CLASSIFIED:		71%(37)			
ENVIRONMENT VARIABLES: 5.					
	LOW	35	10 29%(3)	18 51%	7 20%
	MIDDLE	73	5 7%	56 77%(26)	12 16%
	HIGH	40	0	18 45%	22 55%(9)
TOTAL CASES CORRECTLY CLASSIFIED:		59% (38)			
CHILD AND ENVIRONMENT VARIABLES: 11.					
	LOW	14	10 71%(3)	4 29%	0 0.0%
	MIDDLE	42	1 2%	37 88%(26)	4 10%
	HIGH	29	0 0.0%	5 17%	24 83%(11)
TOTAL CASES CORRECTLY CLASSIFIED:		84 (40)			

[a]PERCENTAGES ARE COMPUTED FOR NUMBER OF CORRECT ACTUAL CASES.

[b]NUMBERS IN PARENTHESES INDICATE PERCENTAGE CORRECT CLASSIFICATION BY CHANCE.

TABLE 29. CLASSIFICATION RESULTS FOR SOCIAL FUNCTIONING WITH BAYESIAN CORRECTION FOR UNEQUAL PRIOR PROBABILITIES

	ACTUAL[b,c] GROUP	N OF CASES	PREDICTED GROUP LOW	MIDDLE	HIGH
CHILD VARIABLES: 12	LOW	14	10 17%(2)	4 29%	0
	MIDDLE	75	2 3%	71 95%(48)	2 3%
	HIGH	19	0	8 42%	11 58%(3)
TOTAL CASES CORRECTLY CLASSIFIED:		85% (53)			
ENVIRONMENT VARIABLES:[a] 6.					
	LOW	14	3 21%(2)	11 79%	0
	MIDDLE	77	3 3%	68 88%(46)	6 8%
	HIGH	22	0	15 68%	7 32%(4)
TOTAL CASES CORRECTLY CLASSIFIED:		69% (52)			
CHILD AND ENVIRONMENT VARIABLES: 10.					
	LOW	13	8 62%(1)	5 39%	0
	MIDDLE	77	1 1%	73 95%(50)	3 4%
	HIGH	19	0	9 47%	10 53%(3)
TOTAL CASES CORRECTLY CLASSIFIED:		83% (54)			

[a] JACKKNIFED CLASSIFICATION

[b] PERCENTAGES ARE COMPUTED FOR NUMBER OF CORRECT ACTUAL CASES.

[c] NUMBERS IN PARENTHESES INDICATE PERCENTAGE CORRECT CLASSIFICATION BY CHANCE.

TABLE 30. CLASSIFICATION RESULTS FOR ADAPTIVE FUNCTIONING WITH BAYESIAN CORRECTION FOR UNEQUAL PRIOR PROBABILITIES

	ACTUAL[a,b] GROUP	N OF CASES	PREDICTED GROUP LOW	MIDDLE	HIGH
CHILD VARIABLES: 10					
	LOW	22	12 55%(2)	10 45%	0
	MIDDLE	77	2 3%	66 86%(40)	9 12%
	HIGH	26	1 4%	14 54%	11 42%(3)
TOTAL CASES CORRECTLY CLASSIFIED:		71% (47)			
ENVIRONMENT VARIABLES: 4					
	LOW	34	8 24%(2)	23 68%	3 9%
	MIDDLE	130	8 6%	111 85%(41)	11 9
	HIGH	32	0	25 78%	7 22%(3)
TOTAL CASES CORRECTLY CLASSIFIED:		64% (47)			
CHILD AND ENVIRONMENT VARIABLES: 12					
	LOW	18	12 67%(3)	6 33%	0
	MIDDLE	67	3 5%	58 87%(38)	6 9%
	HIGH	24	0	12 50%	12 50%(4)
TOTAL CASES CORRECTLY CLASSIFIED:		75% (45)			

[a]PERCENTAGES ARE COMPUTED FOR NUMBER OF CORRECT ACTUAL CASES.

[b]NUMBERS IN PARENTHESES INDAICATE PERCENTAGE CORRECT CLASSIFICATION BY CHANCE.

Table 31--Overall. As noted earlier, the child variable analyses initially began with 17 variables, the environment analyses with 13, and the child and environment analyses with 25. The final number of variables entered for each stepwise analysis are presented after the variable label. For example, "CHILD VARIABLES: 13" from Table 28 indicates 13 child variables were entered according to the stepwise criteria used in this analysis. Specific variables entered for each analysis have been discussed and are listed with their standardized coefficients on Tables 23, 25, and 27. The frequency of actual group membership is entered by rows for each classification and the group memberships predicted by the discriminant function are entered by columns. Percentages below each cell represent the number of actual cases correctly predicted by the discriminant function. Numbers in parentheses are the prior probabilities squared and multiplied by 100. These numbers represent the percent correct classification by chance alone for that cell. Examination and comparison of the functioning area classification tables follow.

For all functioning areas child variables predicted total group classification better than environment variables. The difference between child and environment variables in correct classification by percentage points ranged from a low of three for Overall functioning to a high of 16 for Social functioning with Academic (12) and Adaptive (7) in the middle.

In three functioning areas a combination of child and environment variables had the highest total hit rate. These hit rate results included: Academic-child = 71%, combination = 84%, Adaptive-child = 71%, combination = 75%, Overall-child = 64%, combination = 76%. The Social

TABLE 31. CLASSIFICATION RESULTS FOR OVERALL FUNCTIONING WITH BAYESIAN CORRECTION FOR UNEQUAL PRIOR PROBABILITIES

	ACTUAL[b] [c] GROUP	N OF CASES	PREDICTED GROUP LOW	MIDDLE	HIGH
CHILD VARIABLES:[a] 11.	LOW	18	7 39%(3)	11 61%	0
	MIDDLE	58	4 7%	42 72%(29)	12 21%
	HIGH	32	1 3%	11 34%	20 63%(9)
TOTAL CASES CORRECTLY CLASSIFIED:		64% (40)			
ENVIRONMENT VARIABLES: 4.					
	LOW	20	7 35%(2)	9 45%	4 20%
	MIDDLE	84	7 8%	66 79%(32)	11 13%
	HIGH	38	2 5%	22 58%	14 37%(9)
TOTAL CASES CORRECTLY CLASSIFIED:		61% (43)			
CHILD AND ENVIRONMENT VARIABLES:[a] 9.					
	LOW	10	6 60%(1)	3 30%	1 10%
	MIDDLE	48	2 4%	38 79%(31)	8 18%
	HIGH	28	1 4%	6 21%	21 75%(11)
TOTAL CASES CORRECTLY CLASSIFIED:		76% (43)			

[a] JACKKNIFED CLASSIFICATION

[b] PERCENTAGES ARE COMPUTED FOR NUMBER OF CORRECT ACTUAL CASES.

[c] NUMBERS IN PARENTHESES INDICATE PERCENTAGE CORRECT CLASSIFICATION BY CHANCE.

area was the exception where child variables alone resulted in the highest hit rate by two percentage points: child = 85%, combination = 83%.

As total hit rates increase, increases in the hit rate diagonal (upper left to lower right) necessarily increased, while false negative (predicted to be in one group when actual group membership is with another) and false positives (not predicted to be in a group when it should be) decreased. Considering all analyses the fewest errors were made in classifications between the low and high groups, while the most frequent errors were made with middle and low or middle and high groups. The fewest middle with low groups and middle with high group errors were made with the child and environmental analysis for Academic, Adaptive, and Overall functioning and the child analysis for Social functioning. Hit rates for low, middle, and high level groups were examined in Tables 29-31.

The prediction success among analyses have been explored, but not between each analysis and prediction by chance. Again referring to Tables 28-31 the reader by visual examination can observe that every analysis using child, environment, or child and environment variables had better hit rates than expected by chance.

In sum, the predictive validity of the child and environment variables in combination was supported. In three functioning areas a combination of child and environment variables provided the most accurate classification, while in the fourth area child variable by themselves were best. Relatively few errors were recorded between the low and high extremes of each functioning area, when compared to the middle and the extremes. And in all analyses the hit rates were greater than those expected by chance.

IV. DISCUSSION

This study's purpose was to investigate the efficacy of a multivariate kindergarten screening battery in predicting end-of-year kindergarten performance. Specifically, the unique and combined predictive validity of child and environmental measures was examined. This chapter will discuss the implications of the study's major findings, review the research's methodological limitations, and propose suggestions for new studies.

A comprehensive battery of child measures, including eight subtests for the McCarthy Scales of Children's Abilities (MSCA), two scales for the Developmental Learning Program (DLP), two scales from the Kindergarten Developmental Review (KDR), and two teacher, two parent, and one parent/teacher difference scales from the Child Behavior Form (CBF) was collected at the beginning of the school year. The intent of this battery was to obtain information relevant to the unique cognitive, social, adaptive, and developmental status of each child at school entry. Information obtained through this battery was then used to predict end-of-year success.

Surprisingly, only the two teacher CBF scales significantly discriminated among the study's schools and classes. Thus, the nine kindergarten classes from the three schools were homogeneous in regard to entry level cognitive, academic, and parent perceived social/adaptive skills. This finding was unexpected considering the socioeconomic diversity among the schools represented. Significant SES,

as measured by parents' education, and race differences were found between School A and School B and race differences between School A and School C. Children from the lower SES schools were initially comparable to those from the more middle class schools. Thus, presumed SES-related differences on pre-school status were not found.

The basis for this finding is unclear. Potentially, the child measures used were insensitive to SES differences. Four of 17 correlations between SES and child variables were significant and the largest (r = .30) accounted for only 9% of the variance. No correlations between SES and the parent or teacher CBF scales, DLP skills, or KDR Self-Help scales approached significance. In past studies Kaufman and Kaufman (1973a), Kaufman and Kaufman (1973b), and Kaufman and DiCuio (1975) found the MSCA subtests to be generally free from significant sex and race bias, even though Umansky and Cohen (1980) dispute this claim. The findings of this study tend to support Kaufman and his colleagues' results.

An alternative explanation is that previously reported differences between lower SES and disadvantaged and higher SES and more advantaged children (Burnes, 1970; Cole & Bruner, 1971; Hobbs, 1975; Mercer, 1975; Ogbu, 1978; Teledgy, 1973, 1974; Zigler & deLabry, 1962) have been moderated by social changes. For example, might the availability of educational television be an equalizing factor? Past reports (Cole & Bruner, 1971; Havighurst, 1970; Zigler & Butterfield, 1968; Zigler, Abelson, & Seitz, 1973) have suggested that cognitive test performance differences were due to motivational factors. Motivation has been a factor in assessed abilities with older children, but this study

suggests kindergarten children may now be entering school with similar interest and desire to perform and achieve. In sum, SES and motivational differences relating to cognitive abilities appear to need reanalysis in light of the present findings.

A third alternative explanation is that teacher ratings, which have frequently been used as outcome measures (Hightower, 1981), are biased. Unlike the other child measures, teacher CBF ratings significantly differentiated children across schools and classes. Perhaps observed CBF differences reflect the idiosyncratic rating styles of teachers rather than actual child differences. This finding supports conclusions from prior research (Bolstad & Johnson, 1977; Flook & Velicer, 1977; Spivack & Swift, 1973; Wells & Peterson, 1978). An alternative explanation regarding teacher ratings involves SES. Lorion et al. (1981) found significant SES and race relationships with teacher CBF ratings. In the present study, schools that differed on CBF ratings also differed on SES levels and race, but correlations between CBF rating and SES were not significant. That SES levels and race influence teacher ratings was found by Barclay and Wu (1980). SES and race probably influence teacher ratings, but differences in internal rater norms or idiosyncratic rating styles received more support in this study. For example, even though there were differences among schools that parallel SES differences, there were also significant differences among teachers within the same school. Children with similar SES, race, community influence, etc., were rated differently.

Before teacher ratings are used in future studies or applied settings to differentiate and compare functioning levels, rater bias

should be controlled. First, rater training should be considered. As knowledge and experience in a scale's use and purpose increase, its reliability increases (Novack et al., 1973). Assuming that training and experience alone will solve the problem of teacher rating styles is of questionable validity. In this study the teachers had two years experience completing the CBF, a measure which has simple explicit directions, but had significantly different ratings! A methodologically sound but pragmatically unrealistic solution to raters' bias would be to assess and maintain interobserver agreement after training has occurred. In most research and applied settings, the costs associated with this step would be prohibitive. A final more pragmatic solution is to make a linear transformation by standardizing ratings for each classroom (i.e., equating means and standard deviations). With micro or main-frame computers, large samples of teacher ratings would be processed. For small samples a hand calculator would be adequate. If no computing devices are available or comparison between classrooms or schools is not desired, rank ordering of scores might be easiest and most useful in determining a child's relative strength and weaknesses in assessed areas within a class. Assessing and analyzing the characteristics of the sample and the assessment tools is necessary to understand the screening process, but more information is needed to determine a screening battery's predictive validity.

Correlations between child measures and end-of-year measures provide useful information about the kind of information needed to predict end-of-year success. If variables assessed in the beginning or middle of a school year are significantly related to end-of-year or some

future criterion of performance, and accurate predictions of outcome can be determined, then in psychometric terminology the variables have predictive validity. They can accurately predict future performance. In this study child variable correlations with end-of-year measures provided relationship indices spanning eight to nine months.

MSCA subtests, as a group, had the strongest correlational relationships among all child and environmental variables with almost all end-of-year criteria. The relative strength of these cognitive subtests in relationship to academic areas was expected and supported by prior research (Kaufman & Kaufman, 1977; Kaufman, 1977; McCarthy, 1972). Interestingly, MSCA subscores also had relatively strong relationships with social and adaptive functioning. One possible developmental explanation is that those children who excel in one functioning area similarly excel in other developmental areas (Kohlberg & Zigler, 1967; Mischel, 1973). Another possibility is that some of the subtests such as DAC and DAD not only assess cognitive and psychomotor abilities, but also support traditional clinical use of these and similar measures (i.e., Human Figure drawings) as emotional and social assessment tools (Bender, 1946; Goodenough, 1949; Harris, 1963; Koppitz, 1963, 1968, 1975).

One MSCA subtest and the other child measures (DLP, KDR, and CBF) did not predict across the entire spectrum of school success criteria (.e., adequate teacher ratings, report card ratings, and posttest performance). While the teacher CBF scores, DLP Body Awareness, and DLP Laterality had high correlations with some end-of-year criteria,

they were non-significant with others. These results suggest that such variables alone would not be useful in predicting general school success, but would be useful in predicting specific functioning areas. For example, the CBF might be considered if only social/adaptive functioning needed screening.

The other child variables, Picture Memory, both KDR Total Risk and KDR Self-Help, and both CBF parent scales, offered virtually no correlational predictive validity for school related criteria. They had low and non-significant correlations with most and sometimes all of these criteria. These variables, however, did predict parent ratings of school success. It seems parent ratings predict parent ratings, but not criteria related to end-of-year performance in school.

The acquisition of parent ratings as part of future screening batteries seems to be of limited value given this study's findings. One exception to this conclusion might be their use in determining parent/teacher differences. The greater the difference the more likely problems would be assessed at the end of the year, but no cause-effect relationship can be assumed at this time.

Since prior studies have not used parent-teacher rating differences it is difficult to assess the value of these permutations. Future studies are needed to replicate these findings and ascertain the impact of parent/teacher differences. If difference scores prove to be reliable and valid as indicators of performance, person-environment fit, or some other construct, they may be excellent outcome criteria for interventions involving various sets of people (i.e., parent-teacher, student-teacher, principal-student, etc.).

Based on correlational findings, the variables showing the most and the highest correlations (either positive or negative) with all end-of-year criteria might assume to be the best set of predictors for overall functioning. Based on this study, such a child variable battery would include: MSCA:DAD, DAC, Counting and Sorting, Number Questions, Conceptual Grouping, Word Knowledge, Leg Coordination; DLP-Laterality; and CBF-Teacher Sum and Parent/Teacher Difference. A reduction from 17 to 10 variables was based on frequency and strength of individual correlations. These variables may be the best predictors of end-of-year kindergarten success, but their value as long-term predictors needs to be assessed with future studies.

Correlations provide information about screening variables' relationship with end-of-year performance, but they do not assess classification accuracy nor do they assess the predictive power of the variables in combination. Toward this end a series of discriminant function analyses were run.

As noted, child variables related to four areas of functioning--(1) Academic, (2) Social, (3) Adaptive, and (4) Overall--discriminated at a highly significant level among functioning levels (low, middle, and high) within each area, and classified students into the functioning levels more accurately than the environmental variables. The fact that more child (17) than environmental (13) variables entered into the analyses may be one reason for this difference. By chance alone 17 variables should predict better than 13 variables. Examining the difference between the number of variables entered further supports

this possibility and suggests another plausible reason for child variables predicting better. Whereas one child variable (Parent CBF Sum) failed to enter any of the discriminant functions, five environmental variables failed to enter. This suggests more redundancy among the environmental than the child variables, which means the different child variables assessed more unique dimensions. The more dimensions assessed the more potential for accurate classifications. Therefore, 17 child variables had 16 contributing variables, while 13 environmental variables had only 8 contributing variables. In essence, the child variables assessed twice as many dimensions.

The child variables measurement levels may have contributed to better classification. All child variables measured unique child characteristics, while some of the environmental variables measured either classroom or school as the unit of analysis. Intuitively, it makes sense that variables describing a specific child should predict how a specific child will perform better than those describing a classroom. This assumes, of course, that individual classification and prediction is the desired goal.

The child variables were specifically chosen for individual classification, while the environmental measures were selected to assess school, class, and individual measurement levels. It stands to reason, therefore, that the child variables should predict student functioning levels, while the environmental measures should predict school and class functioning levels. Most secondary prevention screening strategies have been directed at the first goal (individual classification), but this study, as will be discussed later, supports environmental screening too.

The child variables' contributions to the prediction functions were determined. Depending upon which functioning area and level one wishes to discriminate, different sets of variables should be used. A subset of variables (i.e., Number Questions, DAC, Teacher CBF Scale 1, KDR Total Risk, and Body Awareness) were useful predictors of multiple functions and may be valuable components of any screening program. For example, the two MCSA subtests (Number Questions and DAC) discriminated between the high and lower (low, middle) functioning areas' levels, while Body Awareness and KDR Total Risk discriminated between the low and higher (middle, high) functioning areas' levels. For academic area predictions, complementing variables would include Teacher CBF Sum and MSCA: Word Knowledge and Counting and Sorting. For social and adaptive areas, recommended additions to the five consistent variables include MSCA-Leg Coordination, and--more tentatively--MSCA-DAD and Parent CBF Sum. These are recommended variables only. Their true predictive validity can only be established with cross validation studies using different samples.

The addition of environmental variables to screening approaches has been frequently recommended (c.f. Chapter I), but never systematically examined prior to this study. Environmental variables studied in this research included: the POI; TOI; two scales from POI and TOI differences on common items; two sociometric ratings (Sit/Work and Play); six subscale scores and a total scale score from the Environmental Rating Scale; the PEL, as an SES measure; and the MCI, as a school measure. This information was appraised during the schools' second semester.

A series of MANOVAs tested for differences among schools and classes for different sets of environmental variables. Significant relationships were examined. They followed a reasonably consistent pattern. School A, as reported by parents, teachers, and students has a lower SES catchment area, more parent/teacher disagreements, poorer school and community relationships, more student relationship problems, and less student satisfaction and cohesion than School B. School C was found to have intermediate ratings and was not significantly different from either School A or School C. It is interesting that the greatest number of parent/teacher disagreements were in the school that had the poorest school and community relationships, the most student problems as judged by teachers, and the greatest difference between the teachers' and parents' educational level. By contrast, the fewest number of parent/teacher disagreements were in the school that had the best school and community relationships, the fewest student problems, and the least discrepancy between teachers' and parents' educational level. Given the small school sample size (N = 3), these interpretations must be considered tentative and in need of cross-validation. They do, however, suggest that discrepant relationships between a community's and teachers' SES levels, ratings on common items, and perceptions of school environments be more seriously considered in future prevention studies. If children enter school at comparable functioning levels, then the study of environmental variables may provide some insight into their academic deterioration.

Correlations between environmental variables and end-of-year measures also followed consistent patterns. Predictive validity as

measured by correlations regarding specific kindergarten children's success for all POI and POI/TOI combinations was not established. Whatever the facets of the schools that are measured by these instruments, they do not appear to be associated with student success.

The correlations between sociometric ratings and end-of-year measures supported their predictive validity for all functioning areas, but especially for the social and adaptive areas. Higher peer group nominations were related to better grades, better teacher ratings, and better performance on posttests. This supports Barclay and Wu's (1980) findings. Not only do peer sociometrics show predictive validity within a year's time, but they have also been shown to be predictive of later dysfunction (Cowen, Pederson, Babigian, Isso, & Trost, 1973; Kohlberg, LaCrosse, & Ricks, 1972; Roff, Sells, & Golden, 1972).

The sociometric ratings also provided evidence for the predictive validity of the teacher CBF, but not the parent CBF. Children identified by teachers as having social and/or adaptive risks in November received students' ratings indicating they were less interested in sitting and working or playing with these students in February. Conversely, students with positive teacher CBF rated social/adaptive skills were better liked by their peers. Parent CBF ratings, however, were unrelated to peer sociometric ratings. Considering these findings and Poteat's (1981) findings that behavioral observations from various school settings can be used to accurately predict sociometric ratings, the utility of the Parent CBF as an index of school social functioning is questionable.

Given the observed predictive validity of sociometric rating their use as a screening tool should be expanded. Most teachers and school psychologists have the skill to administer, score, and use sociometric rating devices. It might take kindergarten teachers a week or two to individually administer a sociometric to their classes during unstructured class times. For classes in second grade and above it might take 30 minutes for a group sociometric administration. Screening should be a process, not an action, and this one environmental variable continues to have potential in that process.

The observed correlational relationships between environment rating scales and end-of-year measures must be interpreted with caution. Since there were nine environmental measurement sets (one set for each classroom), predictive validity cannot be generalized to other samples at this time. The relative strength of the environmental ratings in predicting end-of-year measures, however, suggests a continued need to further explore the impact of these variables.

The physical environment, as measured by the Environment Rating Scale, is an environmental component that has greater temporal stability than, for example, the social component as assessed by the sociometric. Weinstein (1979) reviewed research concerning six physical dimensions. They included: (1) seating position, (2) classroom design, (3) density, (4) privacy, (5) noise, and (6) the presence or absence of windows. Weinstein (1979) found no differences in academic achievement across classrooms which varied in these dimensions. However, nonachievement behaviors and attitudes (e.g., peer relationships,

teacher-student interaction, classroom satisfaction, etc.) were related to such environmental factors. With minor design changes Weinstein (1979) reports the following outcomes: (1) an increase in the children's use of instructional materials, (2) a decrease in disruptive behaviors, and (3) an increase in substantive questionings. If the physical environment of kindergarten and upper grade classrooms can be examined accurately and periodically, and appropriate design changes identified, schools may have available to them a very cost-effective means to maximize their efforts to develop the "whole" child.

The capacity of the environmental variables' ability to predict and classify kindergarten students' end-of-year functioning levels was also examined. Discriminant functions were computed for each functional area. The predictive validity of the sociometric ratings and the Environment Rating Scale was partially supported. For all functional areas, linear combinations of these variables predicted school success at relatively high rates (from 59% to 69% correct classifications). These results are exceptionally good considering that the Environment Rating Scale contributed the same environmental rating scores for each member of a class. A dilemma unfolds.

The use of environmental variables at two measurement levels (group and individual) raises complex statistical and conceptual issues. Statistical techniques are designed to assess individual or group relationships, but not both simultaneously. For example, student sociometric ratings can be individually compared. The higher the rating was, the more other children liked to sit with that student.

With the Environment Rating Scale it can be seen that Class B1 has the highest rating of all nine classes. In this case the unit of analysis is the group. Trickett and Wilkinson (1979) argued that analyses which use individual rather than group were neither conceptually nor practically synonymous since by definition an individual's scores provide an individual perception of the environment, while group scores are measures of the environment. However, after comparing individual ratings and group ratings regarding the same environments, it was determined that individual and group ratings were "almost identical across sample sizes" (Trickett & Wilkinson, 1979, p. 498). This supports the idea that children within the same environment tend to experience that environment similarly. In other words, environmental measurement levels can be interchanged with some degree of confidence. Realizing this, then, it is reasonable to give each student in the class the same environment ratings because they are experiencing the same environment. If individual measures, such as sociometric ratings and parent perception, are also recorded for each student, then both individual and group measures are accurately representing a child's environment. This supports the assumption that the individual child is a unit of analysis in a secondary prevention screening process. Recognizing the above, however, does not dismiss the statistical concern regarding two measurement levels within a statistical analysis. It has been argued that individual and group measures can accurately represent a child's environment, but the reduction in degrees of freedom and loss of variability with the group measure

suggests correction in the present statistical procedures may need to be made. This represents one of many challenges in using environmental measures.

The final goal of this study was to determine the predictive validity of a child and environmental screening battery. When both child and environmental variables were entered in the stepwise discriminant analyses, prediction rates for Academic, Adaptive, and Overall functioning areas showed substantial increases, while in the Social area child and environmental variables were no better than child variables alone. With the combination child and environment battery, the most notable changes occurred in hit rates at the low and high levels. Assuming rigorous conditions for classification (i.e., prior probabilities to be equal to the same size, jack-knifed classification, when appropriate), an average hit rate increase of 21% at the extremes suggests a sizable improvement in classification fidelity.

At least two alternatives exist to explain this increase in predictive power. First, the addition of environmental variables suggested by many (c.f., Chapter I) significantly improves the predictive validity of a typical child screening battery. An average hit rate of 80% for the child and environment battery is five percentage points higher than Jansky (1978) suggested screening batteries can predict. A second explanation is also plausible. As mentioned before, adding variables increases the probability of having a higher hit rate by chance alone. An increase from 17 child or 13 environment to 25 child and environment variables suggests the increase in hit rate may be higher due to chance. Cross validation studies with true experimental

designs are now needed for a more definitive answer to this issue.

In conclusion, this study with all its limitations opens an exciting, challenging, and important interface between past practices and future potentialities. Traditionally, the purpose of school screening has been early identification of potential problems. In the past, students have been the target of screening activities. This study supports screening children. But it also supports screening the environment. In any school or classroom, students are not isolated. They interact. Students talk, play, work, fight, etc. with other students. Students observe, watch, hear, obey, disobey, teach, and learn from teachers. Students observe, reflect, and interpret the community's ideals and ideas, especially those of their parents. Students discover work, play, learn, observe, interpret, and reflect their environment. As Sarason (1981) rhetorically asked, What would have happened to psychology if two rats instead of one were placed in the same Skinner box? This study responds--How about 25 children in the same classroom? How about the same 25 children in different classrooms? The interface between screening the child and screening the environment has been crossed. The potential of screening children, screening the environment, and potentially matching children with a most conducive environment remains exciting, challenging, and as frustrating as ever. Although more questions than answers have been discovered, this study has hopefully stimulated the researcher and practitioner to recognize, consider, and seek to improve upon alternative screening strategies.

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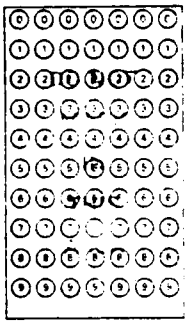
APPENDIXES

APPENDIX A

UNPUBLISHED INSTRUMENTS

NCS Trans Optic 810 30087 321

CHILDREN'S BEHAVIOR FORM (CBF) ©



SEX OF CHILD	MALE ○	FEMALE ○
CHILD'S AGE GROUP (IN MONTHS)		PERSON COMPLETING THIS FORM
36 41 ○		TEACHER ○
42 47 ○		STAFF PERSON ○
48 53 ○		MOTHER ○
54 59 ○		FATHER ○
60 65 ○		OTHER RELATIVE ○
OTHER ○		OTHER PERSON ○

IMPORTANT DIRECTIONS FOR MARKING ANSWERS

- Use black lead pencil only (No. 21 2 or softer)
- Do NOT use ink or ballpoint pens
- Make heavy black marks that fill the circle completely
- Erase cleanly any answer you wish to change
- Make no stray marks on the answer sheet

Instructions For each item listed below, fill in the circle in the column which is closest to how many times you have seen the behavior occur in this child.

PLEASE CHECK

NEVER if this behavior never occurs.
MONTHLY if this behavior occurs only sometimes during the month (but not weekly)
WEEKLY if this behavior occurs sometimes during the week (but not daily).
DAILY if this behavior occurs every day (but not always).
ALWAYS if this behavior occurs many times during the day.

BIRTH DATE

TODAY'S DATE

NAME OF CHILD

	NEVER	MONTHLY	WEEKLY	DAILY	ALWAYS
1. Smiles or laughs	1. ○	○	○	○	○
2. Plays alone	2. ○	○	○	○	○
3. Is restless or itchy	3. ○	○	○	○	○
4. "Performs" for others	4. ○	○	○	○	○
5. Remains dry all day	5. ○	○	○	○	○
6. Seeks attention	6. ○	○	○	○	○
7. Hits other children	7. ○	○	○	○	○
8. Follows directions	8. ○	○	○	○	○
9. Cries easily	9. ○	○	○	○	○
10. Separates easily from parents	10. ○	○	○	○	○
11. Is clumsy or awkward	11. ○	○	○	○	○
12. Shows affection	12. ○	○	○	○	○
13. Tires easily	13. ○	○	○	○	○
14. Asks "how" and "why" questions	14. ○	○	○	○	○
15. Pouts or sulks	15. ○	○	○	○	○
16. Enjoys physical activity	16. ○	○	○	○	○
17. Is easily discouraged	17. ○	○	○	○	○
18. Pretends or "makes-believe"	18. ○	○	○	○	○
19. Learns quickly	19. ○	○	○	○	○
20. Is irritable	20. ○	○	○	○	○
21. Is reckless or daring	21. ○	○	○	○	○
22. Breaks things when upset	22. ○	○	○	○	○
23. Speaks clearly and understandably	23. ○	○	○	○	○
24. Doesn't listen to me	24. ○	○	○	○	○
25. Gets along with other children	25. ○	○	○	○	○
26. Sucks thumb or fingers	26. ○	○	○	○	○
27. Has temper tantrums	27. ○	○	○	○	○
28. Considerate of others	28. ○	○	○	○	○

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CONFIDENTIAL

Kindergarten Developmental Review

Student: _____ School: _____

Parent/Guardian: _____ Sex (Circle one): M F

Address: _____ Today's date: ____/____/____
YR MO DAY

_____ Date of birth: ____/____/____
YR MO DAY

		Question
1. Has your child ever been involved in any of the following types of daycare or preschool programs? (Circle the ones that apply)	daycare ----------1 nursery school---------2 Title I----------3 Headstart----------4 daytime babysitter-----5	1._____
2. Who does your child prefer to play with most of all? (Circle one)	alone----------1 with friends----------2 brother(s) or sister(s)3 with mother----------4 with father----------5	2._____
3. Does your child mostly prefer to play at home, outside, or at a friend's house? (Circle one)	home----------1 outside----------2 friend's house---------3 don't know----------4	3._____
4. Generally speaking, do you think your child is a leader among other children? That is, do you think other children look to him/her to organize group activities?(Circle one)	all of the time--------1 most of the time-------2 sometimes----------3 never----------4 don't know----------5	4._____
5. How often does your child look at a book by himself/herself? (Circle one)	every day----------1 once a week----------2 every couple of weeks--3 rarely----------4 never----------5	5._____
6. How often do you read a story to your child? (Circle one)	every day----------1 once a week ----------2 every couple of weeks--3 rarely----------4 never----------5	6._____

Question

7. Which of the following can your child read? (If more than one applies circle highest number) 7._____

child cannot read---------1
numbers-------------------2
letters-------------------3
words in books------------4
complete stories----------5

8. When your child disobeys, or does something wrong, who typically disciplines him/her? (Circle one) 8._____

Mother--------------------1
Father--------------------2
whichever parent is present-------------------3
person other than parent--4
don't know----------------5

9. How do you most frequently discipline this child? (Circle one) 9._____

have child sit down-------1
talk with child about problem.--------------2
send child to room--------3
spank child---------------4
if toy is involved take it away from child--------5

10. Which discipline method works best? (Circle one) 10._____

have child sit down-------1
talk with child about problem.--------------2
send child to room--------3
spank child---------------4
if toy is involved take it away from child----------5

The next few questions deal with your child's behavior.

During your child's first year did he/she typically:
(Circle the one best answer for each item)

	Always	Sometimes	Rarely	Never	
11. enjoy being rocked----------	1	2	3	4	11._____
12. frighten easily----------	1	2	3	4	12._____
13. cry a lot----------	1	2	3	4	13._____
14. like to be held, touch people, be touched. -	1	2	3	4	14._____
15. cry when hungry or wet----------	1	2	3	4	15._____
16. smile when played with----------	1	2	3	4	16._____

3 Question

In comparison with other children of the same age, did your child:
(Circle the one best answer for each item)

		Much sooner	Somewhat sooner	About same time	Somewhat later	much later	
17.	crawl	1	2	3	4	5	17._____
18.	say words	1	2	3	4	5	18._____
19.	walk	1	2	3	4	5	19._____
20.	say sentences	1	2	3	4	5	20._____
21.	sleep throughout the night.	1	2	3	4	5	21._____
22.	play with other children	1	2	3	4	5	22._____
23.	dress self	1	2	3	4	5	23._____
24.	become entirely toilet trained.	1	2	3	4	5	24._____

Medical History.

For each of the following items, please indicate if your child experienced any of these problems during his/her first year:

		YES	NO	Don't Remember	
25.	numerous illnesses	1	2	3	25._____
26.	regular trouble eating or swallowing	1	2	3	26._____
27.	fevers above 104° on two or more occasions.	1	2	3	27._____
28.	unable to fall asleep	1	2	3	28._____
29.	woke up frequently throughout night	1	2	3	29._____
30.	frequent stomach aches	1	2	3	30._____
31.	numerous bumps and bruises	1	2	3	31._____
32.	convulsion or seizure	1	2	3	32._____
33.	hospitalization due to illness	1	2	3	33._____
34.	hospitalization due to injury	1	2	3	34._____

Special Needs:

Circle the number that corresponds to your answer for each question.	YES	NO	NOT SURE	Question
35. Do you think this child has speech problems?----------	1	2	3	35._____
36. Has your child's speech ever been tested?----------	1	2	3	36._____
37. Is your child being treated for a speech problem? ----------	1	2		37._____
38. Do you think your child has hearing problems?----------	1	2	3	38._____
39. Has your child's hearing ever been tested?----------	1	2	3	39._____
40. Is your child being treated for a hearing problem?----------	1	2		40._____
41. Do you think your child has trouble seeing?	1	2	3	41._____
42. Has your child's vision ever been tested?	1	2	3	42._____
43. Is your child being treated for a vision problem? ----------	1	2		43._____
44. Does your child have any other special medical or psychological problems? (for example, asthma, diabetes, heart murmur, epilepsy, behavior problems, etc.---------	1	2		44._____
45. Has your child ever fainted or passed out?	1	2		45._____

Family Stability:

46. How many times has this child moved during the past 5 years? (Circle one) 46._____

1----------1
2----------2
3 or 4----------3
5 or more-------4
None------------5

47. Is this child adopted (Circle one) Yes-----1 No-------2 47._____

48. Is this child a foster child? (Circle one) Yes-----1 No-------2 48._____

49. Is this child your stepchild? (Circle one) Yes-----1 No-------2 49._____

If you answered yes to questions 47, 48, or 49, skip items 50 to 65. Begin answering question number 66.

An important aspect of a child's medical status is the mother's condition during pregnancy. Please answer the next set of questions in terms of when the mother was pregnant with this child.

50. Including miscarriages, which pregnancy was this child? (Circle one)

1st---------- 1
2nd---------- 2
3rd---------- 3
4rd---------- 4
5th & beyond.----- 5

50._____

51. How many months was the mother pregnant with this child before delivery? (Circle one)

Less than 6------- 1
7---------- 2
8---------- 3
9---------- 4
10---------- 5

51._____

Did you experience the following physical symptoms during pregnancy? (Please answer each item)

	Yes	No	Don't Remember	
52. spotting (vaginal bleeding) -------	1	2	3	52._____
53. cramps or pains in leg(s) ---------	1	2	3	53._____
54. frequent vomiting ("morning sickness")----------	1	2	3	54._____
55. dizziness----------	1	2	3	55._____
56. any illness----------	1	2	3	56._____
57. illness requiring hospitalization--	1	2	3	57._____
58. injury requiring hospitalization---	1	2	3	58._____

59. Approximately how many hours was the mother in labor for this child? (Circle one)

Less than 6-------1
7 - 12 ----------2
13 - 18----------3
19 - 30----------4
More than 30------5

59._____

The following questions deal with the child's birth.

	Yes	No	Don't Know	
60. Did the mother have a cesarean? (Circle one)----------	1	2	3	60._____
61. Was the delivery a breech birth? (Circle one)----------	1	2	3	61._____
62. Were forcepts used during delivery? (Circle one) ----------	1	2	3	62._____
63. Would the mother describe this child's delivery as "easy"? (Circle one)----------	1	2	3	63._____
64. Did the mother give birth under a general anesthesia (was she asleep during the delivery?) (Circle one)----------	1	2	3	64._____
65. Was the mother awake throughout the delivery? (Circle one)-------	1	2	3	65._____

The following questions deal with general information about the parents and the other children in the family.

66. What is the father's current age? (Circle one) 66._____

Under 18----------1
19 - 24 ----------2
25 - 30 ----------3
31 - 36 ----------4
above 36----------5

67. What is the highest grade through high school that the father has completed? (Circle one) 67._____

Less than 6th.----------1
6 to 8 ----------2
Some high school----------3
High graduate----------4
Technical school graduate-----5

68. What education beyond high school/ technical school has the child's father had? (Circle one) 68._____

None----------1
Two years or less of college--2
Four year college graduate ---3
Some graduate education-------4
Graduate degree----------5

69. What is the mother's current age? (Circle one) 69._____

Under 18----------1
19 - 24 ----------2
25 - 30 ----------3
31 - 36 ----------4
Above 36 ----------5

70. What is the highest grade through high school that the mother has completed? (Circle one) 70._____

Less than 6th.----------1
6 to 8----------2
Some high school----------3
High school graduate ---------4
Technical school graduate-----5

71. What education beyond high school has the child's mother had? (Circle one) 71._____

None----------1
Two years or less of college--2
Four years college graduate---3
Some graduate education-------4
Graduate degree----------5

72. How many parents (including step parents) currently live with this child? (Circle one) 72._____

One----------1
Two----------2
None----------3

7 Question

Circle the one corresponding answer for each question:

		1	2	3	4	5	
73.	How many other children currently live in the same house as this child?	None	One	Two or three	Four or five	Six or more	73._____
74.	How many older brothers does this child have?----------	None	One	Two or three	Four or five	Six or more	74._____
75.	How many younger brothers does this child have?-----	None	One	Two or three	Four or five	Six or more	75._____
76.	How many older sisters does this child have?----------	None	One	Two or three	Four or five	Six or more	76._____
77.	How many younger sisters does this child have? ----	None	One	Two or three	Four or five	Six or more	77._____
78.	Have any of the child's brothers received special education services?(Circle one)			Yes----------1 No---------- 2 Don't know-------- 3			78._____
79.	Have any of the child's sisters received special education services? (Circle one)			Yes----------1 No----------2 Don't know---------3			79._____

SELF HELP:		Never	Sometimes	Once in a while	Most the time	Always	
80.	Child goes to toilet without help, unfastens and fastens own clothing and has no daytime accidents.	1	2	3	4	5	80._____
81.	Uses table knife for spreading bread with butter, jam, peanut butter, etc.	1	2	3	4	5	81._____
82.	Child washes and dries face without help from others.	1	2	3	4	5	82._____
83.	Dresses self in all ways including buttoning but not tying.	1	2	3	4	5	83._____
84.	Bathes self without supervision, but someone helps with washing hair.	1	2	3	4	5	84._____
85.	Requires no assistance going to bed. Undresses, uses bathroom, and turns out light by self.	1	2	3	4	5	85._____
86.	Ties shoes without help.	1	2	3	4	5	86._____

87. How well do you think your child will do in school? 87._____

Much better than other children----------1
Somewhat better than other children----------2
About the same as other children----------3
Somewhat worse than other children----------4
Much worse than other children----------5

INSTRUCTIONS FOR ADMINISTERING THE SOCIOMETRIC QUESTIONNAIRE

Introduction: "Hello (name of child). My name is M... _____ and I am interested in how children sit or work and play together. Today, I am going to ask you two questions. One asks who you like to sit and work with and the other asks who you like to play with."

1. Sit Sociometric Say:

"First, I am going to ask you how much you like to sit and work with each of the other boys and girls in the room. But, before we do that let's look at some faces.

Part 1: "Here are some faces I have drawn." (Point to each face and say,
5) "This face is very happy and means you like to sit with that boy or girl a lot.
4) This face is a little happy and means you like to sit with that boy or girl a little.
3) This face in the middle is not happy or sad and means you don't care if you do or don't care if you don't sit with that boy or girl.
2) This face is a little sad and means you don't like to sit with that boy or girl.
1) And, this last face is very sad and means you don't like to sit with that boy or girl at all.
Now tell me what each face means." (Repeat and correct until child can get all correct without help or two (2) trials, which ever comes first.

Part II. "Now we are going to do all the boys and girls in the class. Each time I tell you the name of a boy or girl, I want you to first tell me how much you like to sit and work with him/her. Then I want you to point to the face that shows me how much you like to sit and work with him/her."

State: Name "John Doe"
"How much do you like to sit and work with John Doe"

Note: If subject starts responding without cues, let him/her continue without prompts unless (he/she) forgets the task.

Scoring: Record the number under the face that indicates the subjects response in the score column.

After completing Sit Sociometric, but before starting Play Sociometric:

1) Display second set of faces and remove first set;
2) Shuffle names of students to ensure random order.

2. Play Sociometric Say:

"Now I am going to ask you how much you like to play with each of the other boys and girls in the room. By playing, I mean putting puzzles together, playing games, playing house, and running and playing outside."

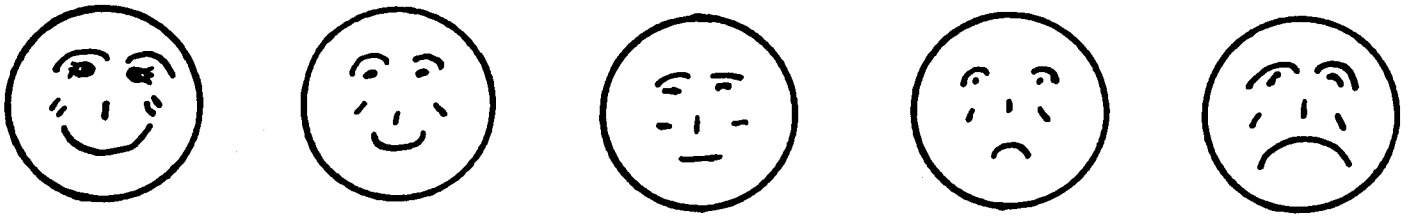
Part I: "Before we start, look at the faces we have now. These faces are just like the other faces, but they are in a different order. (Point to each face and say)
5) Here is the very happy face again, this time it means that you like to play with that person a lot.
4) This face that is a little happy means you like to play with that person a little.
3) The one in the middle that is not happy or sad means you don't care if you do or if you don't play with that person.
2) This face that is a little sad means you do not like to play with that person.
1) And, this face that is very sad means you do not like to play with that person at all. Now tell me what each face means. Repeat and correct up to two (2) times as before.

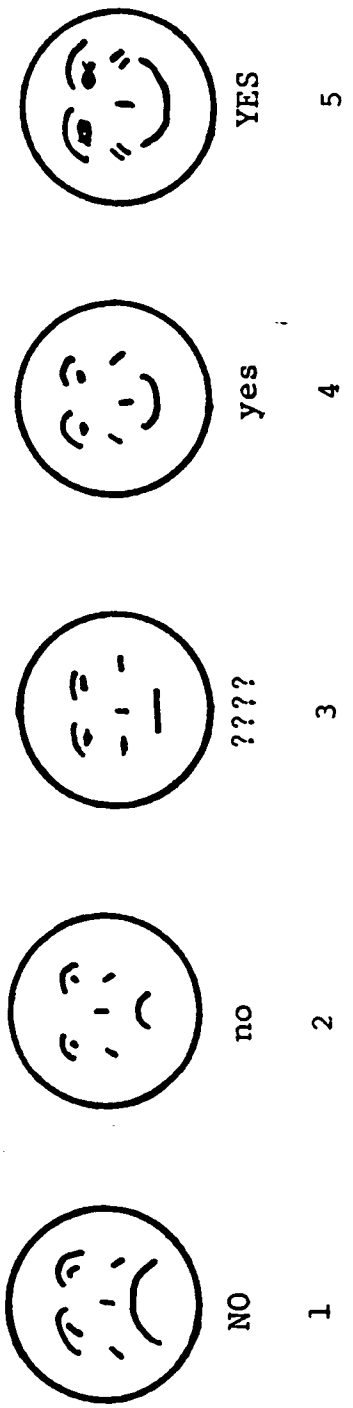
Part II: "Now we are going to do all the boys and girls in the class. Each time I say a name, I want you to first tell how much you like to play with that person and then point to the face that shows me how much you like to play with that boy or girl.

State: (when needed): "(boy's/girl's) name"
"How much do you like to play with John Doe?"

Scoring: As Before.

After completing task, praise child on doing a good job and return to classroom activity.


YES
yes
????
no
NO
5
4
3
2
1


NO
1
no
2
????
3
yes
4
YES
5

SOCIOMETRIC SCORE FORM

ID NUMBER	NAME	SIT WITH NAME	SIT WITH SCORE	PLAY WITH NAME	PLAY WITH SCORE
		Y N		Y N	
		Y N		Y N	
		Y N		Y N	
		Y N		Y N	
		Y N		Y N	
		Y N		Y N	
		Y N		Y N	
		Y N		Y N	
		Y N		Y N	
		Y N		Y N	
		Y N		Y N	
		Y N		Y N	
		Y N		Y N	
		Y N		Y N	
		Y N		Y N	
		Y N		Y N	
		Y N		Y N	
		Y N		Y N	
		Y N		Y N	
		Y N		Y N	
		Y N		Y N	
		Y N		Y N	
		Y N		Y N	
		Y N		Y N	
		Y N		Y N	
		Y N		Y N	

INSTRUCTIONS FOR ADMINISTERING THE CLASSROOM ENVIRONMENT SCALES.

1. Introduction: "Hello! My name is M... and I am interested in how children see their classroom. Today, I am going to pass out a set of questions or what is called a questionnaire. There are a number of possible responses for each question, but there are no right or wrong answers. Be sure to do your own work and don't look at your neighbors paper. Your name will not be on your questionnaire and of course no one will know how you answer.

2. Pass our questionnaire: Before passing out questionnaire say:

   "I am going to give you the questions now. Do not! open them or turn them over until I tell you to."

   Make sure that boys get ones with an M on top and girls get one with F on top. Pass out the questionnaire upside down. When all questionnaires are out, say:

   "Check your questionnaire and make sure that if you are a boy you have an M on top and if you are a girl you have an F on top. Raise your hand if you have the wrong letter." (Pause and wait for any response)

3. Fill in AGE Say:

   "Now put your age on the line under the Big M or F" (point to line and wait) Ask: "If you are not finished raise your hand" (Repeat until everyone is done.)

4. Read Directions and Work Example. Say:

   "Good. Now turn over the questionnaire and we will read the directions and work on example." (Go to directions on questionnaire and read)

M

AGE_____

SCHOOL_____

TEACHER_____

GRADE_____

DIRECTIONS

This is not a test. The questions inside are to find out what your class is like. Please answer all the questions.

Each sentence is meant to describe your class. If you agree with the sentence circle yes. If you don't agree with the sentence, circle no. If you are not sure, circle maybe.

Example

	Circle Your Answer		
1. Most children in the class are good friends.	yes	maybe	no

If you think that most children in the class are good friends, circle the yes like this:

1. Most children in the class are good friends.	(yes)	maybe	no

If you do not think that most children in the class are good friends, circle the no like this:

1. Most children in the class are good friends.	yes	maybe	(no)

If you are not sure if most of the children in the class are good friends, circle the maybe like this:

1. Most children in the class are good friends.	yes	(maybe)	no

Now turn the page and answer all the questions about your class.

-1-

	Circle Your Answer
1. The pupils enjoy their schoolwork.	yes maybe no
2. Children are always fighting with each other.	yes maybe no
3. Everyone knows what the class is going to do.	yes maybe no
4. Some pupils always want to be first.	yes maybe no
5. Many pupils do not know how to do their schoolwork.	yes maybe no
6. All the children have close friends in the class.	yes maybe no
7. Most of the children in the class enjoy school.	yes maybe no
8. Some pupils hate the others.	yes maybe no
9. Sometimes pupils do not know what to do.	yes maybe no
10. The pupils want to know who got the best mark on a test.	yes maybe no
11. Children often say that school is hard.	yes maybe no
12. All of the children like each other.	yes maybe no
13. Most pupils are pleased with the class.	yes maybe no
14. Sometimes pupils in the class disagree.	yes maybe no
15. Some pupils don't know what they have to do.	yes maybe no

	Circle Your Answer		
16. Some pupils always want to do best in class.	yes	maybe	no
17. All the children understand their work.	yes	maybe	no
18. Many children in the class play together after school.	yes	maybe	no
19. Sometimes pupils don't like the class.	yes	maybe	no
20. Some pupils don't like other pupils.	yes	maybe	no
21. Not all pupils know what is coming next in class.	yes	maybe	no
22. Some pupils always seem to finish last.	yes	maybe	no
23. Children often find their work hard.	yes	maybe	no
24. Children in the class are good friends.	yes	maybe	no
25. Most children like school this year.	yes	maybe	no
26. Some pupils are not friendly to other pupils.	yes	maybe	no
27. Children know what work they have to do.	yes	maybe	no
28. Some pupils always do better than the rest of the class.	yes	maybe	no
29. Only the smart pupils can do their work.	yes	maybe	no
30. Children have secrets with other children in the class.	yes	maybe	no

	Circle Your Answer		
31. Most children like the class.	yes	maybe	no
32. Children don't always agree.	yes	maybe	no
33. Most pupils know what the lesson is about.	yes	maybe	no
34. Some pupils always try to do their work better than the others.	yes	maybe	no
35. Schoolwork is hard to do.	yes	maybe	no
36. Some pupils are not good friends with other pupils.	yes	maybe	no
37. The class is fun.	yes	maybe	no
38. Some children don't like other children.	yes	maybe	no
39. Pupils are sometimes not sure what they must do.	yes	maybe	no
40. Pupils always try to get the best mark on a test.	yes	maybe	no
41. Most pupils know how to do their schoolwork.	yes	maybe	no
42. All of the children know each other well.	yes	maybe	no
43. Most of the pupils like their class.	yes	maybe	no
44. Certain pupils always want to have their own way.	yes	maybe	no
45. The class always knows what work it must do.	yes	maybe	no

	Circle Your Answer		
46. Some pupils always seem to finish first.	yes	maybe	no
47. Many pupils find their schoolwork hard.	yes	maybe	no
48. All pupils in the class are close friends.	yes	maybe	no
49. Most pupils are happy in class.	yes	maybe	no
50. Fights between pupils are common.	yes	maybe	no
51. Some pupils don't know what they are supposed to do.	yes	maybe	no
52. Some pupils feel bad when they do not do as well as the others.	yes	maybe	no
53. Many pupils say that school is easy.	yes	maybe	no
54. All of the pupils like one another.	yes	maybe	no
55. Children seem to like their class.	yes	maybe	no
56. Certain pupils don't like what other pupils do.	yes	maybe	no
57. Pupils always know what is coming next in class.	yes	maybe	no
58. Pupils race to see who can finish first.	yes	maybe	no
59. Most of the pupils know how to do their work.	yes	maybe	no
60. Children in the class like each other as friends.	yes	maybe	no

BASIC ACADEMIC SKILLS ENHANCEMENT PROGRAM

Competency Rating Form

Student:_____ Grade____ Sex: M F Today's date:____/____/____
Mo Da Yr

Parent/Guardian:_____ Person completing form (circle one):
Parent/Guardian ----- 1

Teacher:_____ Teacher ---------- 2

The items presented below are intended for research purposes only and will be kept strictly confidential. The information requested will assist in better understanding children's progress through school. No teacher or principal will be allowed to see your ratings. These results will not be placed in your child's file.

For each item circle the number in the column which most closely represents your observation or opinion about how this child has performed thus far.

Please use the following performance scale:

1) High Performance - Top or best 5% of all children in this grade;

2) High Average Performance - Better than average, but not tops;

3) Average Performance - Middle 50% of all children in this grade;

4) Low Average Performance - Close to average, but having some difficulties;

5) Low Performance - Lowest 5% of all children in this grade;

		Performance				
A.	**Motor Skills:**					
1.	Walking, running, jumping, skipping, etc. ---------	1	2	3	4	5
2.	Throwing, catching ----------	1	2	3	4	5
3.	Balancing ----------	1	2	3	4	5
4.	Cutting, drawing, coloring, pasting, etc. ---------	1	2	3	4	5
5.	Overall motor performance ----------	1	2	3	4	5
B.	**Academic Skills:**					
6.	Speaking words and sentences ----------	1	2	3	4	5
7.	Listening skills, following directions, recall ----	1	2	3	4	5
8.	Forming letters, numbers ----------	1	2	3	4	5
9.	Recognizing letters, letter sounds, words, and other reading skills. ----------	1	2	3	4	5
10.	Counting, number identification, number concepts, and other math skills ----------	1	2	3	4	5
11.	Overall academic performance ----------	1	2	3	4	5
C.	**Social Skills:**					
12.	Plays well with other children ----------	1	2	3	4	5
13.	Cooperates with other children ----------	1	2	3	4	5
14.	Is a leader among peers ----------	1	2	3	4	5
15.	Communicates well with adults ----------	1	2	3	4	5
16.	Cooperates with adults ----------	1	2	3	4	5
17.	Overall social performance ----------	1	2	3	4	5
D.	**Adaptive Skills:**					
18.	Mood is balanced and stable ----------	1	2	3	4	5
19.	Adjusts well to changes in routine ----------	1	2	3	4	5
20.	Copes well with failure ----------	1	2	3	4	5
21.	Cares for self and belongings ----------	1	2	3	4	5
22.	Is organized ----------	1	2	3	4	5
23.	Is trustworthy ----------	1	2	3	4	5
24.	Overall emotional maturity ----------	1	2	3	4	5

APPENDIX B

LETTERS AND CONSENT FORMS

KINDERGARTEN PERMISSION LETTER AND CONSENT FORM

The University of Tennessee, Knoxville
College of Liberal Arts
Department of Psychology

KNOXVILLE, TN 37916
(615) 974-2531

Dear Parents:

As you are aware, your child is participating in the Basic Academic Skills Enhancement (BASE) Program as part of his kindergarten experience. The purpose of BASE is to develop an efficient way to acquire information about your child's academic potential.

This year we are in the process of evaluating how different school environments affect different children. To explore this relationship, measures of classroom learning environments and parent opinions regarding elementary school are being solicited. Students involved in this study will be asked to rate their classroom by answering a number of multiple choice questions. These questions will be read aloud and each student will make his/her response. There are no right or wrong answers.

Parents are being asked to complete the Parent Opinion Inventory which will be used to measure parent attitudes towards the school program. Again there are no right or wrong answers.

We are also interested in how children's social skills relate to classroom behavior. This information can be obtained by individually administering a friendship rating scale and/or social problem-solving scale to children participating in this study. The friendship ratings will ask participating students how much they like to play, work and sit with each of their classmates. The two social problem solving scales which will be used are gamelike in format and are considered enjoyable by most children. Observations of behavior will then be made to determine relationships between ratings and observable behavior.

In order for us to conduct this research, we need you to sign the Parent Consent Form printed on the back of this letter. Please keep the other copy of this letter for your records. Your permission allows your child to complete a questionnaire whereby he/she rates his classroom learning environment complete a friendship rating form and participate in the social problem-solving skill assessment. All information will be entirely confidential. No student, teacher or school staff member will be allowed to see how a child rates his/her classroom. All scales will be administered by individuals involved in the BASE Project and under the direction of Dr. Raymond P. Lorion. Students will not be removed from the school building nor will their education be interrupted.

The opinions you give will also be kept entirely confidential. No student, other parent, teacher, principal or school staff will be allowed to see how you rate the school. All inventories will be collected by personnel from the BASE Project.

If any results of this study are published, the anonymity of the children, parents, teachers and schools will be maintained. Both you and your child's participation is strictly voluntary and you may withdraw your permission at any time without penalty. We will be available to answer your questions throughout the duration of the project. Please feel free to call us at 974-2165. If we are not available when you call, please leave your name and number so that we may return your call. We appreciate your cooperation.

Sincerely,

Raymond P. Lorion, Ph.D.

Alan Dirk Hightower, M.A.

A. Barbara Ostendorf, B.A.

I have read the purposes and procedures of this study and have been given the opportunity to ask questions about them.

I understand that my child will complete a friendship rating scale and/or social problem solving scale.

I have voluntarily participated and I give my permission for my child to be involved in this study.

I understand that I may ask questions and that I may withdraw my permission at any time without penalty.

_____

Child's Name

_____

Parent's Signature

_____

Date

SECOND, THIRD, AND FIFTH GRADE PERMISSION LETTER AND CONSENT FORM

The University of Tennessee, Knoxville
College of Liberal Arts
Department of Psychology

KNOXVILLE TN 37916
(615) 974-2531

Dear Parents:

This year we are in the process of evaluating how different school environments affect different children. To explore this relationship measures of classroom learning environments and parent opinions regarding your child's elementary school are being solicited. Students involved in this study will be asked to rate their classroom by answering a number of multiple choice questions. These questions will be read aloud to the entire class at one time, and each student will anonymously mark his/her answer. There are no right or wrong answers.

Parents are being asked to complete the Parent Opinion Inventory, which will be used to measure parent attitudes towards the school program. Again, there are no right or wrong answers.

In order for us to conduct this research, we need you to sign the Parent Consent Form printed on the back of this letter. Please keep the other copy of this letter for your records. Your permission allows your child to complete a questionnaire whereby he/she rates his classroom learning environment. All student's ratings will be entirely confidential. No student, teacher, or school staff member will be allowed to see how a child rates his/her classroom. All questionnaires will be administered and collected by students from the University of Tennessee. Students will not be removed from the classroom nor will their education be interrupted.

The opinions you give will also be kept entirely confidential. No student, other parent, teacher, principal or school staff will be allowed to see how you rate the school. All inventories will be collected by students from the University of Tennessee.

If any results of this study are published, the anonymity of the children, parents, teachers, and schools will be maintained. Both you and your child's participation is strictly voluntary, and you may withdraw your permission at anytime without penalty. We will be available to answer your questions throughout the duration of the project.

If you have any questions please call either of us at 974-2165. If neither of us are in, please leave your name and number and we will return your call. We will be glad to answer any additional questions you might have.

Sincerely yours,

Raymond P. Lorion, Ph.D.

Alan Dirk Hightower, M.A.

ADH/dh

I have read the purposes and procedures of this study and have been able to ask questions about them.

I understand that my child will complete a classroom environment rating scale.

I have voluntarily participated and I give my permission for my child to be involved in this study.

I understand that I may ask questions and that I may withdraw my permission at any time without penalty.

_____
Child's Name

_____
Parent's Signature

_____
Date

REQUEST TO KINDERGARTEN PARENTS TO COMPLETE

PARENT COMPETENCY RATING FORM

May 11, 1982

Dear Parent,

As you are aware your child's kindergarten class has been participating in the Basic Academic Skills Enhancement (BASE) program. A major goal of this program has been to help children learn better. At this time we are in the process of evaluating this program. The BASE program must get a "report card".

Since your child's kindergarten year will be ending soon, we are asking that you help us by completing the enclosed rating form on your child. Please be honest. The information about your child will not be shared with any teacher, principal or other school staff. The rating form and your ratings will never be placed in your child's file. We will only use the information to better understand how your child has progressed this year. Parents are very important people and we need your honest observations and opinions.

Please read the directions and then complete every item on the enclosed form. After doing so, place the form in the envelope, seal the envelope, and return it to school with your child as soon as possible. All forms will be collected by personnel from the BASE project.

If any results of this study are published, the anonymity of the children, parents, teachers and schools will be maintained. Your participation is strictly voluntary and you may withdraw your permission at any time without penalty. We will be available to answer your questions throughout the duration of the project. Please feel free to call us at 974-2165. If we are not available when you call, please leave your name and number so that we may return your call. We appreciate your cooperation.

Sincerely,

Raymond P. Lorion
Professor and Director
School/Community Psychology
BASE Director

A. Dirk Hightower
BASE Co-Director

W. C. Work
BASE Co-Director

ADH/dh

APPENDIX C

FREQUENCY OF RETURN OF PARENT OPINION INVENTORY

BY SCHOOL AND GRADE

	SCHOOL			
	A	B	C	TOTAL
KINDERGARTEN				
NUM. RETURN	67	65	56	188
TOTAL	86	81	70	237
PERCENT	78%	80%	80%	79%
SECOND GRADE				
NUM. RETURN	54	52	43	149
TOTAL	109	101	82	292
PERCENT	50%	51%	52%	51%
THIRD GRADE				
NUM. RETURN	57	50	21	128
TOTAL	102	90	52	244
PERCENT	56%	56%	40%	52%
FIFTH GRADE				
NUM. RETURN	55	58	37	150
TOTAL	105	112	73	290
PERCENT	52%	52%	51%	52%
TOTALS				
NUM. RETURN	233	225	157	615
TOTAL	402	384	277	1,063
PERCENT	58%	59%	57%	58%

APPENDIX D

SPEARMAN CORRELATION COEFFICIENTS FOR REPORT CARD ITEMS BETWEEN GRADING PERIOD 4 AND GRADING PERIOD 6 FOR CLASS B2

REPORT CARD ITEM	SPEARMAN COEFFICIENTS
1	1.00
2	.87
3	1.00
4	1.00
5	.89
6	.43
7	1.00
8	1.00
9	.84
10	.94
11	.99
12	1.00
13	1.00
14	1.00
15	1.00
16	1.00
17	1.00
18	1.00
19	1.00
20	1.00
21	1.00
22	1.00

VITA

Alan Dirk Hightower was born in Rochester, New York on March 12, 1953. He graduated from Wayne Central High School in Ontario, New York, in June 1971. Attendance at the University of Maine, Orono, which started in September of 1971, culminated in May of 1975 with a Bachelor of Arts degree in psychology. For the next three years, Dirk lived and worked in Reedsburg, Wisconsin. He was employed at the Tri-County Human Services Center, a comprehensive community mental health center.

In September 1978 Dirk entered the School/Community Psychology graduate program at The University of Tennessee, Knoxville. A Master of Arts degree was earned by him in December of 1980 and the Doctor of Philosophy degree with a major in psychology in December 1982.

Dirk is a member of Phi Kappa Phi, East Tennessee Association of School Psychologists, and the National Association of School Psychologists, American Psychological Association--Division 16 and Division 27. He served as a student editor of the American Journal of Community Psychology during 1982, as a chairperson of the student affiliates in school psychology of The University of Tennessee, Knoxville, in the 1981-82 school year, and on numerous departmental committees. Dirk has accepted an appointment at the University of Rochester as Co-ordinator of Research for the Center for Community Study and as Assistant Professor part-time.

Dirk is married to Linda Eggert Hightower. Dirk and Linda have one child, Tait Alex.