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ABSTRACT

A 2-year study was conducted to determine whether service delivery variables in Head Start programs have a direct, positive effect on child performance and home environment. The study sample of 402 four-year-old children was drawn from 12 Head Start programs in Oregon, Washington, and Idaho. The centers represented three types of models: traditional center-based programs, home-based programs, and three different combination center- and home-based programs. Outcomes were measured using a variety of behavioral, developmental, and psychometric scales for children; kindergarten records; interviews with parents; home observations; and parent measures on locus of control, beliefs about child behavior, and social support. Study findings included the following: (1) at the end of the Head Start year (Year 1), the combination models achieved equivalent outcomes as the center- or home-based models; (2) after Year 1, neither the number of center nor home visits was associated with child performance gains; (3) at the end of years 1 and 2 (the kindergarten year), there were no significant differences among the models in improvements in the home environment; however the home-based programs consistently achieved higher scores on measures of home environment; (4) there was no relationship between improvements in the home environment and gains in child performance; and (5) after Year 1, programs within similar models produced different child performance gains, but after Year 2, similar programs produced equivalent gains. (AC)

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Head Start Research Project: Variations in Service Delivery Models in Region X

Condensed Report

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EXECUTIVE SUMMARY
THE HEAD START VARIATIONS STUDY: EFFECTS OF HOME-BASED, CENTER-BASED, AND COMBINATION HEAD START MODELS

The Head Start Variations Study was a 2-year study to determine if service delivery variables in Head Start programs have a direct, positive effect on children, as measured by **child performance**, and their families, as measured by **home environment.** The total sample of 402 children was drawn from 12 Head Start programs in Region X. All children were four-year-olds entering their first preschool program. The research examined six service delivery models, with two programs selected to represent each model. The models fell into three types:

center-based: the traditional Head Start program, providing 4 center visits per week.

combination: programs that represent a mix of center-based and home-based models. Three models were selected to represent the range of combination programs used in Region X.

home-based: programs in which home visitors are responsible for delivering educational programming.

Primary Question

Do Variation-in-Attendance models achieve the same outcomes as Center- and Home-Based models?

- At the end of the Head Start Year measures of **child performance** and **home environment** indicated that, in general, the Variation-in-Attendance models achieved equivalent outcomes as the Center- or Home-based models. (See pages 21 and 23.)

- At the end of the Head Start year, neither the number of center nor home visits were associated with **child performance** gains. (See Figure 2, page 22.)

- At the end of the kindergarten year, **child performance** was higher for children from the two Center-based models and two of the Variation-in-Attendance models than for children in the Home-based model and one of the Variation-in-Attendance models (3 center visits per week, 8 home visits per year). (See pages 27 and 29.)

- At the end of the Head Start year and the kindergarten year, there were no significant differences among the models in improvements in the **home environment.** However, the Home-based programs consistently achieved higher scores on measures of **home environment.** (See Figs. 3 and 6, pages 22 and 29.)

Secondary Questions

Do improvements in the **home environment** result in improved **child performance**?

- At the end of the Head Start year and the kindergarten year, there was no relationship between improvements in the **home environment** and gains in **child performance.** (See Figures 4 and 7, pages 22 and 29.)

Do programs operating within similar models produce equivalent gains in **child performance?**

- At the end of the Head Start year, programs within similar models produced different **child performance** gains. This indicates that variables other than the number of center visits or home visits must account for **child performance.** Quality indicators such as the content of the Head Start curriculum, the methods of instruction, the expertise of the Head Start staff, and the content of the home visits need to be examined in combination with the number of center visits and home visits. (See pages 23 and 30.)

- At the end of the kindergarten year, children from programs within similar models evidenced equivalent **child performance** gains. This finding is difficult to explain but seems to indicate the need for future studies to account for curriculum content and instructional methods within the subsequent post-Head Start educational settings. (See pages 23 and 30.)

Do programs operating within similar models produce equivalent gains in the **home environment?**

- At the end of the Head Start year and the kindergarten year, programs within similar models did not produce equivalent gains in the **home environment.** This finding indicates that, as suggested above, quality factors of the home-visit activities (such as purpose of home visits, and content of the home-visit activities) need to be studied. (See pages 23 and 28.)

I. INTRODUCTION

A. Purpose of the Study

In an effort to address the diverse needs of young children and families who live in poverty, the Region X Head Start community has, over the last decade, designed an array of Head Start service delivery models. These models reflect various combinations of center-based classroom sessions and home-based services. Some of these indigenous models have now come into use in other parts of the country.

In 1987, the U.S. Department of Health and Human Services, ACF National Office, and the Region X ACF Office of Human Development Services funded the Washington Research Institute to undertake a comprehensive longitudinal study of the major approaches to serving Head Start children and families in Region X. The primary purpose of this study was to determine if the variation-in-attendance programs achieved results comparable to those of center-based or home-based programs. Another goal of this research was to provide policy makers at the national and regional levels with information to help set minimum standards for particular Head Start program models.

This study did not attempt to examine the overall effectiveness of Head Start programs. Nor did it set out to "prove" that one service delivery approach was better than another. Rather, the goals of the evaluation were to determine which program variables had direct, positive impact on child or family outcomes. These findings could then be used to assist policy makers and Head Start staff to make informed decisions on the program features they would incorporate in order to achieve their desired outcomes.

The first step in this research was to identify and describe the current array of service delivery models used in Region X Head Start programs. Programs were reviewed and six models were identified, ranging from primarily center-based to primarily home-based. Several intermediate models (known technically as variation-in-center-attendance models) combine center and home approaches. The center-based model provides children with four days per week of classroom instruction and three annual home visits. In contrast, the home-based model provides one home visit per week and one day of classroom instruction per month annually. In between are several combination models. One, for example, provides three days per week of classroom instruction and eight annual home visits.

The second step of this research project was to select two program sites to represent each of the six models. To ensure that the selected 12 program sites would be of a high quality and in compliance with all Head Start performance standards, Region X administrators and members of an Advisory Task Force, knowledgeable about programs within the region, participated in the selection process.

The third step of the research process was to select measurement instruments and collect a broad range of data on child (achievement, readiness, behavior) and family (childrearing practices, knowledge of child development, employment) characteristics for

approximately 35 children and families randomly selected from Head Start enrollees at each of 12 Head Start sites. Head Start program variables described service delivery models (e.g., various combinations of center visits per week and family visits per year), educational and family program components (e.g., teacher and home visitor credentials, home visit activities, class size, number of aides, and parent involvement activities), and the relationships between specific program features and child and family outcomes (e.g., school readiness, parenting skills).

This Condensed Report summarizes procedures and findings for the two years of this study. The Head Start Research Project Technical Report (Edgar, et al., 1992) contains a detailed description of study procedures, methods, data analysis, and findings.

B. Background

The preponderance of research literature on the effectiveness of early intervention indicates that Head Start programs increase low-income children's school readiness and IQ scores; moreover, after entry into school, Head Start graduates relative to comparable children without Head Start show lower special education referrals, retention rates, and juvenile delinquency rates (The Consortium for Longitudinal Studies, 1983; McKey, Condelli, Ganson, Barrett, McConkey, & Plantz, 1985). However, with respect to school achievement, differences between Head Start participants and non-Head Start control groups dissipate after two to three years (McKey, et al., 1985). Although the relative contributions of factors (e.g., genetic endowment, family and home environment, and quantitative and qualitative aspects of early intervention efforts) that dictate long-term outcomes (e.g., school achievement) are difficult to estimate, the home and family environment carries considerable weight. Some authorities contend that if risk factors in the home environment are not addressed, the cognitive and affective changes induced by direct, child-focused intervention are unlikely to endure (Peters, Bollin, Murphy, & Berg, 1988). Most supporters of early intervention programs now encourage an "ecological approach" that includes modifications both outside and within the home environment. The working hypothesis of the total ecological model is that effects gained from enriching the child's outside environment (e.g., structured preschool experiences) must be accompanied by improvements of the child's home environment, lest they be lost (Bronfenbrenner, 1974; Goodson & Hess, 1975; Weiss & Jacobs, 1988).

Recognition of the powerful influence that the constellation of family and home environment has on children, and acknowledgement that this constellation can limit or enhance the effectiveness of direct intervention on the child, has led Head Start program designers to experiment with different approaches to serving low-income children and their families. These alternative approaches are designed to attain goals not only for the child, but for the family as well. These programs also attempt to upgrade the family's capacity for caretaking by addressing the financial, social, and health concerns of the caregiver.

However, the proliferation of alternative models has raised issues regarding their effectiveness. Questions arise about which combinations of educational and family

services are most effective, and for whom. Because locally designed Head Start programs have been developed to accommodate the particular geographical, educational, and social needs of particular populations, service delivery models differ widely, particularly in the amount of contact time provided to children and their families. For example, within Region X, some programs offer children 4 days of center-based instruction weekly and approximately three 1-hour visits to the home annually, whereas other programs offer 2 days of center-based instruction weekly and 16 home visits per year. Is such variation in services associated with different child and family outcomes? Do the services that families receive differ qualitatively across various service delivery models as a function of the quantitative differences in center and home visits? Unfortunately, little information is available on the relationship between specific program features and Head Start goals for children and their families.

A 2-year study by Peters et al. (1988) compared the effects of different delivery modes on the immediate outcomes for children and parents. A total of 174 parent/child dyads participated in one of three models:

1) Traditional: 5 days per week, half-day, center-based program in which parent participation was encouraged and where home visits occurred at least three times per year.

2) Home/School: 2 days per week of center-based activities, and one 90-minute family visit per week.

3) Home-based: only home visits conducted by home visitors who provided curriculum materials and specific lesson assignments to parents to carry out with their children. In addition, children met twice per month for group socialization periods.

Peters et al. (1988) found that the traditional (center-based) program was associated with greater, though marginal, gains in the academic areas of reading and math. In contrast, the home-based program was more effective in producing changes in the family and home environment of the children. The home/school program, generally speaking, produced greater direct child changes than the home-based program, and greater parent and home environment changes than the traditional program, though it did not excel in either area. The researchers concluded: "It would appear that the amount of program time invested in bringing about enduring changes in the child's home environment is of greater, and perhaps more critical importance, than the amount of time invested on child in-class time" (p. 54).

Although the Peters et al. (1988) study is provocative, it examined only three Head Start programs which represented three models of service delivery. It is not known, for example, whether other programs using the same service delivery models as studied by Peters et al. would have similar effects, or whether effects of the particular combination (home/school) model examined by Peters et al. are representative of the effects produced by other combinations of home and center services.

C. Conceptual Model for this Research

Figure 1 depicts the conceptual model upon which this study was based. The model assumes that a variety of child and family characteristics interact with various features (i.e., educational and family services) of intervention programs to influence family and child outcomes. Moreover, the model assumes that family and child characteristics have reciprocal effects, such that changes in a family characteristic (e.g., childrearing philosophy) can affect a child characteristic (e.g., language development).

This model was developed from conversations with Head Start directors in Region X, and permits measurement of the relative power of the components delineated in Figure 1. If this model is correct and the selected measures of the various model components are sensitive to change, factors that relate to family and child change should be identified. If the model is incorrect (i.e., other variables account for family and child differences) or if the measures are insensitive, it will not be possible to account for differences.

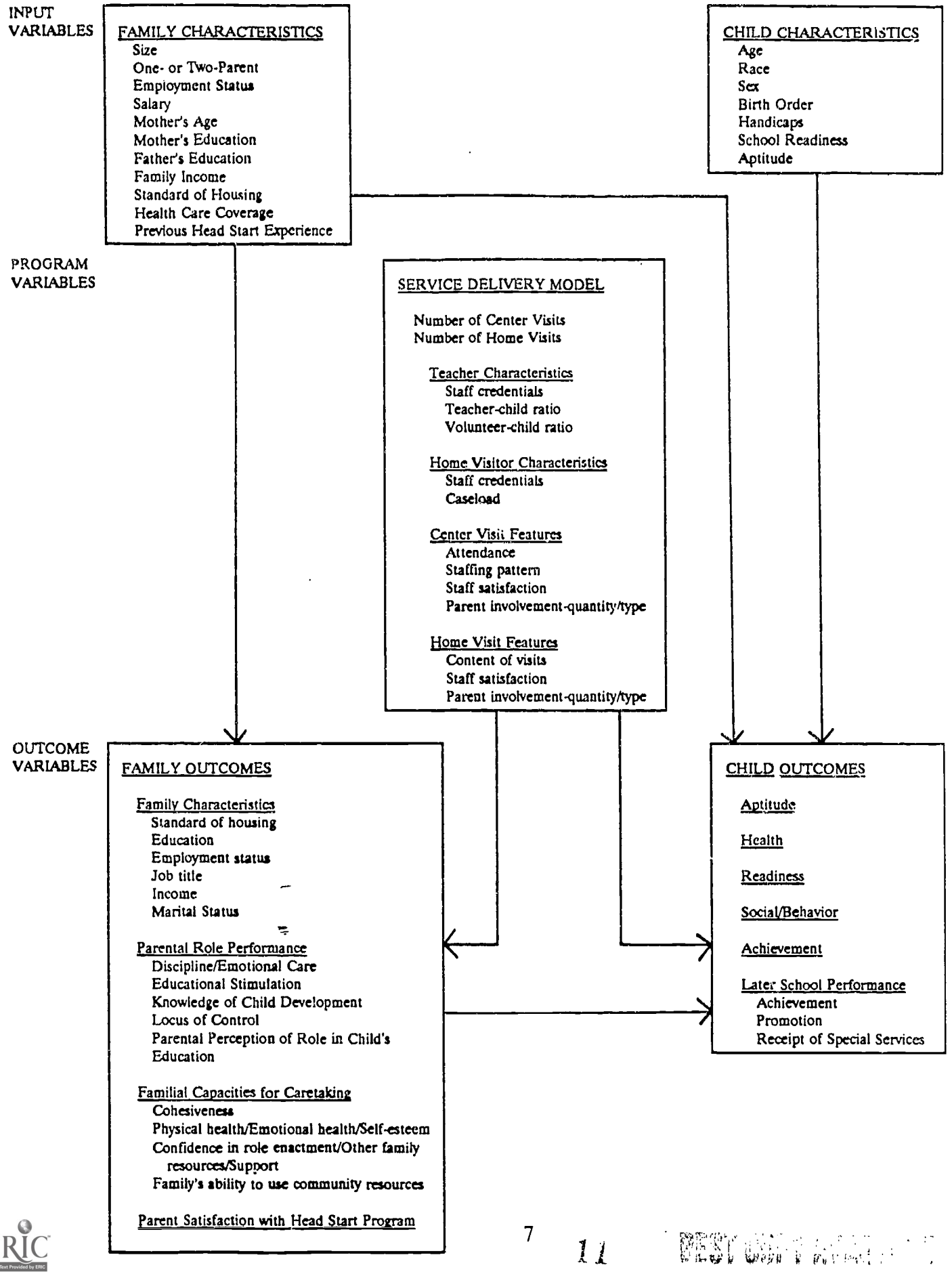
The next step was to identify the family and child input variables (e.g., education, employment, child's gender) that might have significant effects on the outcome variables. Once the variables were identified, measurements or indices for each variable were obtained or, if necessary, created.

Input variables. The top two boxes in Figure 1 include variables that describe the characteristics of children and families at entry to Head Start which might moderate program impact. Because random assignment of children and families to alternate program models was not possible, it was essential to measure important background characteristics (e.g., mother's education, salary, numbers of hours employed, child aptitude, sex) so that initial differences between groups could be statistically adjusted.

Program variables. Head Start programs vary widely in the amount and type of educational and social services they provide. The amount of child and family contacts in the different Head Start programs was documented. Cost prohibited observation of the quality of specific teacher and child behaviors and classroom activities in centers. However, an attempt was made to document the amount and type of home-visit activities, using self-report data of the home visitors. In addition, service delivery was characterized by documenting the staff-to-client ratios, and the credentials (e.g., BA degree in education) of the service providers.

Child/family outcomes. Over the years since Head Start was first conceived, local program developers have built a variety of Head Start models around the required core components. Programs vary in their emphasis on specific child and family outcomes. In this research study, it was necessary to focus on the major intended outcomes of Head Start. Thus, during the 1987 and 1988 planning phase, the research team worked closely with an Advisory Task Force comprised of directors from Head Start programs across Region X to obtain consensus on the major child and family outcomes that Head Start programs attempted to influence. Figure 1 depicts the outcomes for which measures were selected.

FIGURE 1: Conceptual Model.



II. METHOD - YEAR ONE

A. Year One Questions (1988-89)

Primary Question

Do variations-in-attendance models achieve the same outcomes as center- or home-based models?

Secondary Questions

Do improvements in the **home environment** result in improved **child performance**?

Do programs operating within similar models produce equivalent gains in **child performance**?

Do programs operating within similar models produce equivalent gains in **home environment**?

B. Sample

1. Clusters. After completion of a comprehensive demographic study of program models, using the Region X ACYF data base, and telephone and mail-out surveys, six primary clusters of program models were identified. These clusters represented alternate combinations of center visits per week and family visits per year. The six service delivery models represented the range of Head Start options: center-based, combination (or variation-in-center-attendance), and home-based. For each of the six program models two program sites following that model were selected.

Center-based model. This model represented the most traditional Head Start program, providing four center days per week and two to three family visits per year. Note that a "center day" extends 3½ - 4 hours for all models. The home visits focus primarily on the child's educational program.

Combination models. These models fell in between the pure center-based and home-based endpoints, and are used by approximately 81% of Head Start grantees in Region X. They incorporate elements of both center-based and home-based programming: the number of center days per week ranges between 2 and 3; the number of home visits per year ranges between 7 and 24. For this evaluation, three combination models were selected to represent the range of variation-in-center-attendance programs in Region X: three center visits per week and eight home visits per year; three center visits per week and 16 home visits per year; and two center visits per week and 16 home visits per year.

Home-based model. This model represented a home-based program in which home visitors had responsibility for delivering the educational component of Head Start to

both children and parents. The home-based models were designed to make 32 home visits during the year. In addition, parents and children were encouraged to attend two group socialization sessions per month which were held at a central location.

2. Sites. Table 1 lists the sites within each cluster that participated in this study. Selection of specific sites took into account not only the number of center and home visits, but also the number of 4-year-olds served, and the attrition rate reported in the Region X data base. In addition, programs using one of the targeted delivery models were surveyed to obtain information on their curricula, class size and placement procedures, staff training, multi-ethnic representation, and urban/rural location. Programs which used special curricula or which were considered of low quality by the Region X administrators and/or members of the Advisory Task Force were eliminated. In general, it was found that the majority of Head Start programs in Region X were eclectic in their choice of curricula.

3. Children. A total of 402 children were drawn from the 12 Head Start programs. All children were 4-year-olds who were entering a preschool program for the first time in the fall of 1988. Approximately 35 children were randomly selected from each program, except the programs from Cluster C: Program 5 from Cluster C contributed 56 children to the initial sample; Program 6 contributed 17 children. See Table 1 for the number of children sampled from each site.

Excluded from the study were children who had developmental disabilities or who were receiving concurrent services from another agency, roughly 10% of the 4-year-olds served in these centers. Children with communication problems or social/emotional disorders, however, make up a large proportion of the Head Start population, in some programs as great as 40%. These children were included because excluding them from the study would have severely limited the generalizability of the findings. Additionally, in one site children were included who were served through a state program modeled after Head Start, the Early Childhood Education and Assistance Program. Entry requirements and services in that program were the same as those stipulated under the federal guidelines for Head Start services.

4. Attrition rate. At the end of posttesting in May, 1989, the total sample was 338 children/families, an attrition rate of 15.9%. The home-based programs experienced higher levels of attrition -- approximately 35%. (See Table 1.)

C. Outcome Measures

Instruments were selected that measured outcomes identified by the Advisory Task Force as important to Head Start. These instruments were also selected on the basis of their psychometric properties (validity and reliability standards) and their prior use in early childhood research.

Table 1

Initial Sample, Attrition, and Final Sample

		NO. Ss	YEAR 1 ATTRITION	YEAR 2 ATTRITION	FINAL
CENTER-BASED MODELS					
Cluster A: 4 Center Visits/Week, 2-3 Family Visits/Year		64	13	4	47
- Program 1:	Portland Public Schools Head Start Portland, Oregon	33	7	2	24
- Program 2:	Educational Service District No. 121 Seattle, Washington	31	6	2	23
Cluster B: 4 Center Visits/Week, 8 Family Visits/Year		68	7	4	57
- Program 3:	Kids and Company Head Start Lebanon, Oregon	34	3	2	29
- Program 4:	Mason-Thurston Head Start Olympia, Washington	34	4	2	28
COMBINATION MODELS					
Cluster C: 3 Center Visits/Week, 7-8 Family Visits/Year		73	8	3	62
- Program 5:	Bellingham-Whatcom Head Start Bellingham, Washington	56	7	1	48
- Program 6:	Clallam-Jefferson Community Action Council Port Angeles, Washington	17	1	2	14
Cluster D: 3 Center Visits/Week, 16 Family Visits/Year		65	5	9	51
- Program 7:	Salem Family Head Start Salem, Oregon	32	2	4	26
- Program 8:	Umatilla-Morrow County Head Start Pendelton, Oregon	33	3	5	25
Cluster E: 2 Center Visits/Week, 16 Family Visits/Year		69	9	5	55
- Program 9:	North Idaho Head Start Coeur d'Alene, Idaho	34	8	2	24
- Program 10:	Pocatello Schools Head Start Pocatello, Idaho	35	1	3	31
HOME-BASED MODELS					
Cluster F: 32-34 Family Visits/Year		63	22	5	36
- Program 11:	Skagit County Head Start Mount Vernon, Washington	32	12	2	18
- Program 12:	Twin Harbors Head Start Aberdeen, Washington	31	10	3	18
TOTAL SAMPLE		402	64	30	308

1. Child Performance. The following measures were administered in September 1988 as pretests and in May 1989 as posttests:

The Preschool Behavior Rating Scale (PBS). This measures children's social and behavioral skills in a preschool setting. Three of the five PBS rating scales were used: Receptive Language, Environmental Adaptation, and Social Relations.

Cooperative Preschool Inventory (CPI). The 64-item Inventory measures children's basic information and vocabulary; number concepts and ordination; concepts of size, shape, motion, color, time, object class, and social functions.

The Peabody Picture Vocabulary Test-Revised (PPVT-R). This measures children's receptive vocabulary.

Subscales of the Head Start Measures Battery (HSMB). The Head Start Measures Battery is a path-referenced assessment which defines performance in terms of position on empirically validated paths reflecting development. Two subscales (Math and Reading) from the Battery were selected for this evaluation.

2. Home Environment. The following measures were administered at pre- and posttest:

The Home Observation for Measurement of the Environment (HOME). This instrument has been used widely in research studies and evaluations of parenting programs. It requires a one-hour interviewer/observer visit to a child's home to record information about the home environment, to observe parent-child interaction, and to ask a few questions of the caregiver present.

Concepts of Development Questionnaire. The questionnaire includes two subscales (Categorical and Perspectivistic) consisting of 20 four-point items. The caregiver is asked to agree or disagree with statements regarding beliefs about children's behavior.

Parental Locus of Control. The questionnaire consists of 46 four-point items. The caregiver is asked to agree or disagree with statements about his/her locus of control orientation (e.g., " My life is chiefly controlled by my child." " Even if your child frequently tantrums, a parent should not give up.").

Community Life Skills Scale. This measures the degree of support available to the caregiver. Two subscales, Support Services and Support-Involvement, consisting of 12 yes/no items, were selected for this evaluation.

D. Procedures

A member of the research team served as project coordinator to orchestrate the recruitment and testing of the 402 children and their families, supervise the collection of

program data from the 12 program sites distributed across three states, and coordinate data processing and analysis. In addition, the following personnel were hired.

Local research coordinators. At each site, a research coordinator was hired to oversee local data collection and acted as liaison to the project. These coordinators supervised local data collection, arranged for scheduling of testing, participated in the testing of children, procured child attendance records, and monitored completion of: the home visit form, a log on parental involvement, the Concepts of Development Questionnaire, the Parental Locus of Control, and the Intake and Exit Family Interviews. Most of the coordinators held positions as educational or social service coordinators for the local programs.

Testers. Twelve on-site testers were hired for sites which were not readily accessible to the Seattle area. These individuals were professionals from the Head Start program or the local community. The testers administered the PPVT, CPI, and HSMB Reading and Math in the autumn and spring, and the K-ABC in the autumn.

In addition, six additional assessment personnel were hired to serve as itinerant testers for sites adjacent to the Seattle area. All were masters level, early childhood education or special education professionals.

Home observers. Twenty-three home observers -- two observers per site -- were hired to visit homes of Head Start families to administer the Home Observation Inventory and the Community Life Skills Scale. However, in two sites, a single home observer completed the observations for all of the families participating in the research project. Most of the home observers were public health nurses, social workers, or mental health professionals.

Local coordinators and testers attended a two-day meeting in Seattle. There, they were informed about the rationale and design of the research, the instruments, and the data collection plan, and received training in administering and scoring the tests and process measures. During training, testers were instructed to follow the standardized administration procedures exactly (e.g., organizing the testing environment, establishing basals and ceilings) in order to ensure comparability of testing conditions across sites. Testers practiced administering the tests under supervision and received feedback on specific procedures. During the training session, site testing teams comprised of the local coordinator and testers completed a site specific plan for conducting parent interviews as well as all other data collection procedures.

In addition, home observers who required training in the administration of the HOME attended a one-day training session. Following training, home observers conducted 10 practice observations with another observer to establish observer reliability prior to beginning actual observations of participating families. Home observers were at least 90% reliable on reliability checks taken during the one-day training session and scored at least 96% reliability on the 10 practice observations prior to actual data collection. The average reliability across the 10 practice observations was 98%. Finally, reliability checks

were obtained on the first and eleventh HOME observations during both the pretest and posttest phases and are reported below.

The Project Coordinator monitored data-collection procedures across the 12 sites via telephone and written correspondence, and, in addition, visited each site to review data collection procedures and observe program activities.

Autumn (Pre) Data Collection. The following measures were collected in autumn: PPVT, K-ABC, CPI, PBS, Parent Intake Form, Concepts of Development Questionnaire, Parental Locus of Control, and the HOME. This data collection phase extended from September 10 to October 31 because the annual start-up dates of the various sites differed by as much as six weeks.

Mid-Year Assessments. Staff ratings of family functionality and information on staffing patterns and program resources (e.g., facilities, staff turnover rate) were collected mid-year. Specific assessment instruments, Family Functionality Scales, Home Visitor Caseload Information, Classroom Program Information, Program Data, are shown in Appendix A.

Ongoing Data Collection. Home visitors completed a Home Visitor Form following each educational and social service home visit. They recorded the total minutes spent in the home, the individuals present during the home visit, the primary intent of the visit, and estimates of the number of minutes spent on each of 10 activities (e.g., assessing or teaching the child; describing to or modeling for the parent how to assess or teach the child; discussing with the caregiver the child's educational program; giving materials to the caregiver). A category was reserved for activities which did not match the activities listed on the form ("Other"). Home visitors turned in these forms to the local research coordinator monthly. The local research coordinator monthly completed forms on the child's attendance and the parent's involvement in program activities. Monthly attendance data included the number of days the child attended center classes and the number of home visits that the child was present. The parent involvement data comprised a record of the number of hours the primary caregiver spent volunteering in center classes, participating in parent education classes, and attending policy council sessions. Monthly, the local coordinators forwarded the ongoing data to the project office, where it was checked and entered in the computer.

Spring (Post) Data Collection. Posttest dates for each child were set for seven months after pretest. Local coordinators were given a target test date for each child and asked to schedule testing within a two-week period of the target date.

All children were tested on site. In addition, Head Start field staff collected family demographic information (Family Exit Interview) and conducted a one-hour parent interview (Concepts of Development Questionnaire and the Parental Locus of Control). Home observers completed the HOME, the Community Life Skills Scale and the Parent Satisfaction Questionnaire. Posttesting was complete by June 10.

III. PROCESS AND IMPACT RESULTS - YEAR ONE

A. Pretest Results

Home observers completed a reliability check of the HOME on the first observation and again on the eleventh observation. All observers maintained 94% or above on the reliability checks of the HOME during the pretest phase. Mean concurrence was 97%.

Univariate analyses (ANOVA) of demographic variables were conducted to determine whether initial differences existed in the subject samples at different sites prior to Head Start intervention. Two discriminant analyses were conducted to determine whether initial differences existed among sites with respect to (1) child characteristics and (2) the home environment (including SES, family functionality, and the HOME). First, the sites were discriminated on the basis of child characteristics (sex, age, birth order, race, medical problems, and K-ABC). Although some mean differences were significant--there were more non-Caucasian children in Model A (center-based) and Model F (home-based); there were fewer males in Model A (center-based); and there was more unemployment in Models A (center-based) and Model F (home-based)--there was considerable overlap and it is not possible to clearly discriminate among the programs. (See Table 2.) (See Technical Report, Appendix B, Edgar et al., 1992.)

Second, a discriminant analysis carried out on the combined SES, HOME, and family functionality data fairly clearly distinguished Program 10 from Programs 5 and 12. Program 10 was relatively low on the HOME scales, especially Academic Stimulation and Learning Stimulation, and the Community Life Skills Scale, and high on the family functionality scales, especially Parents' Motivation for Problem Solving. Program 7 was similar to Program 10 in having initially low scores on Academic Stimulation and Learning Stimulation and high family functionality scores on average. (See Technical Report, Edgar et al., 1992, for details.)

Univariate analyses of variance (ANOVAs) on the child pretest data were conducted to determine whether initial differences existed between alternate delivery systems prior to the Head Start intervention. In general, few initial differences were found among sites with respect to child characteristics, pretest performance, or the family environment. (See Technical Report, Edgar et al., 1992, for details.)

B. Frequency Distributions of Child Measures and the HOME Scale

The frequency distributions of the pretest scores were examined to check for floor and ceiling effects. The frequency distributions of the K-ABC (sum of performance subscales), the Reading and Math subscales of the HSMB, the PPVT, the Concepts of Development Questionnaire, and the Parental Locus of Control Questionnaire were normally distributed. The frequency distribution of the CPI was negatively skewed; 126 cases (31%) scored at or above the 90%. Although the overall mean percentile was 65, the test had limited utility in measuring growth in children scoring in the upper ranges on the pretest.

Table 2

Summary of Population Characteristics: Year 1

	Percents of Total				
Model/Program	Ethnicity Caucasian	Gender Male	One Parent Family	No one employed	Mother $\bar{x}$ education
Center A	68.6	31.4	64.7	62.7	11.68
1	65.4	26.9	76.9	50.0	11.52
2	72.0	36.0	52.0	76.0	11.84
Center B	90.2	55.7	65.6	54.1	11.87
3	90.3	54.8	51.6	48.4	11.53
4	90.0	56.7	80.0	60.0	12.20
Combination C	88.7	52.3	67.7	56.9	12.37
5	87.0	51.0	71.4	59.2	12.42
6	93.8	56.3	56.3	50.0	12.20
Combination D	76.7	58.3	58.3	38.3	11.77
7	70.0	60.0	53.3	46.7	11.87
8	83.3	56.7	63.3	30.0	11.67
Combination E	90.0	48.3	50.0	38.3	12.27
9	100.0	42.3	34.6	38.5	12.08
10	82.4	52.9	61.8	38.2	12.41
Home F	63.4	46.3	63.4	65.9	11.39
11	60.0	55.0	55.0	65.0	11.25
12	66.7	38.1	71.4	66.7	11.52

The PBS was negatively skewed and showed some ceiling effects. Although the mean was 47 out of a possible raw score of 61 with a standard deviation of 8.6, 50% of the sample scored between 49 and 61 raw score points.

The overall pretest mean on the HOME was 42.6 out of a total of 55 possible. Only 7% of the sample obtained a score of 50 or more on this instrument. However, examination of subscales revealed a number of potential ceiling effects.

Given the problem of ceiling effects on the subscales, a principal-components analysis with varimax rotation was conducted to determine whether the subscales represented six separate constructs.

This analysis suggests that two factors explain the variation in the HOME. Therefore, two summary scores were generated, one representing a dimension on environmental stimulation, and the other representing a dimension on discipline. Summary Score 1 (Stimulation) is a composite of scores from subscales loading high on Factor 1 (subscales 1-5 and 7). In like fashion, Summary Score 2 (Discipline) is a composite of subscales loading high on Factor 2 (subscales 6 and 8).

C. Mid-Year Measures Analyses

At mid-year, Head Start staff rated families on the Family Functionality Scale, i.e., the "well-being" of the family with respect to the following domains: parent's mental health, knowledge of child care and development, parent's motivation for problem-solving, and emotional care and stimulation. For the final analyses, these ratings were used along with the initial HOME scores and other socioeconomic indices to adjust for family differences in determining the relationship between program and family outcomes.

D. Process Results

The process measures used in this research dealt with the amount and character of home visits. Summary statistics were generated to measure the total amount of home visit intervention that each family received, based on the documentation of the home visits conducted during the year-long Head Start intervention.

Number of home visits. Only 5 of the 12 programs delivered on average the number of home visits stipulated by the program model. For example, Programs 5 and 6 from Cluster C (three center days per week, eight home visits per year) actually made only 6.0 (75%) and 5.8 (73%) home visits, respectively, on average. Likewise, Programs 9 and 10 from Cluster E (16 home visits) made an average of only 13.96 (87%) and 10.91 (68%) home visits, respectively. The two home-based programs, 11 and 12 (Cluster F), made an average 22 of their prescribed 32 home visits, approximately 69%.

Moreover, the variation in the number of home visits within clusters and sites was substantial. The distributions of home visits overlap across clusters, particularly for the combination models. For example, many families from Program 7 which averaged 16.7

home visits per year (SD=4.64) received the same number of home visits as many families in Program 12 which averaged 19.6 home visits per year (SD=4.88). Although there was a general trend of more home visits in programs that provided fewer center days (e.g., 2.6 home visits in Cluster A versus 21.5 home visits in Cluster F) there were clear exceptions. Programs 9 and 10 from Cluster E (two center days per week) provided 12.23 home visits, versus Programs 7 and 8 from Cluster D (three center days per week) which provided an average of 16.66 home visits. Thus, the loss of one day of center service (e.g., delivering two rather than three center days per week) was not necessarily offset by increased home intervention. However, the home-based models fared worst in providing opportunities for developmental stimulation of children by providing only 69% of their service. (See Table 3.)

Home visitor activities. Comparison of the number of home visits reveals general differences in service delivery among the various clusters and sites. A more detailed comparison of program differences can be made through an examination of the specific activities of home visitors (e.g., number of minutes/week spent assessing/teaching the child; modeling assessing/teaching for caregiver; discussing social concerns with caregiver, etc.). However, using the number of minutes devoted to specific home visit activities to compare clusters or sites may be misleading because some clusters (i.e., program models) provided many more home visits than others (e.g., Cluster A prescribed two educational home visits per year and Cluster F prescribed 32). Consequently, the calculation was made of the proportion of home visitor time spent in different activities and was considered a fairer basis for comparing clusters or sites.

The highest overall proportion of time was discussing the educational program with the caregiver (.19). Establishing and maintaining rapport (.14) was the activity allocated the second highest overall proportion of time. The activity allocated the overall lowest proportion of time was assessing or teaching the child (.03). In general, the proportion of home visit time in which the caregiver or the home visitor instructed the child was low across all sites. Overall there was little similarity between programs within model. (See Table 4.) (See Technical Report, Edgar et al., 1992, Appendix G, Year 1 for more detailed data.)

E. Impact Results

Raw Gains. Examination of the overall differences in the pretest measures revealed these differences were minor (see Table 5). Although pre to post gains are positive, gain scores were of small magnitude. The multivariate analyses discussed in the next section showed a substantial regression to the mean effect (regression coefficients of gains on pretest scores typically around -0.5) suggesting that the true gain scores were relatively small.

The family measures also changed little from pre to post. Most notably the Concepts of Development Questionnaire, the Parental Locus of Control, and the Community Life Scale showed virtually no change: 0.04 (total), 0.02, and 0.63, respectively. The change from to pre to post on the HOME is only 2.39 points. Note that the negative change

Table 3

Year 1 Home Visit Data

Program Option amd Site	Number of home visits		Number of minutes spent in home per week		Average # of visits per month	
	Mean	SD	Mean	SD	Mean	SD
Center (A)	2.56	.88	3.21	1.45	.36	.09
1-Portland	3.12	.93	4.07	1.45	.40	.10
2-ESD 121	2.00	.29	2.32	.75	.32	.06
Center (B)	6.74	2.06	16.74	5.34	.98	.26
3-Lebanon	5.32	1.58	13.06	4.26	.83	.25
4-Mason-Thurston	8.20	1.35	20.54	3.28	1.13	.16
Combination (C)	5.95	.80	10.04	3.15	.77	.12
5-Bellingham	6.00	.87	11.00	2.89	.80	.13
6-Clallam	5.81	.54	7.12	1.82	.70	.07
Combination (D)	16.66	3.40	37.22	12.30	2.22	.45
7-Salem/Dallas	16.73	4.64	44.06	13.64	2.23	.61
8-Umatilla	16.57	1.14	29.89	3.45	2.20	.14
Combination (E)	12.23	2.79	24.24	7.24	1.67	.31
9-North Idaho	13.96	2.07	30.37	5.55	1.84	.26
10-Pocatello	10.91	2.55	19.56	4.26	1.55	.29
Home-Based (F)	21.53	5.13	56.16	11.05	2.79	.53
11-Skagit Co.	23.42	4.76	58.37	10.85	2.94	.48
12-Coastal Comm.	19.63	4.88	53.96	11.09	2.64	.55
TOTAL SAMPLE (n = 331)	10.37	6.68	22.90	17.82	1.40	.85
F Ratio (by option)	332.18		299.60		406.25	
p=	.00		.00		.00	
F Ratio (by site)	184.96		208.57		208.22	
p=	.00		.00		.00	

Table 4

Home Visit Data

Program Option	Proportion of Time Spent on Activities: Establishing and maintaining rapport	Assessing and teaching child	Observation of caregiver by teacher	Discussing educational program
Center A	.13	.05	.03	.36
1	.13	.10	.03	.29
2	.14	.00	.03	.42
Center B	.14	.04	.08	.16
3	.15	.07	.15	.15
4	.13	.02	.02	.18
Combination C	.14	.00	.02	.23
5	.14	.00	.02	.20
6	.16	.01	.00	.33
Combination D	.14	.05	.15	.10
7	.14	.04	.13	.09
8	.15	.05	.17	.11
Combination E	.14	.01	.12	.14
9	.12	.00	.03	.19
10	.15	.02	.20	.11
Home F	.12	.03	.19	.12
11	.11	.06	.22	.12
12	.14	.00	.15	.13
TOTAL	.14	.03	.09	.19

Table 5

Pre to Post Mean Gains on Child and Family Measures

Child measures	Pre	Post	Gain
PBS	47.55	52.56	5.01
CPI *	66.04	78.80	12.76
PPVT *	33.46	43.13	9.67
MATH **	491.95	525.12	33.17
READING **	486.19	510.96	24.77
Family measures			
HOME:			
Learning Stimulation	7.03	7.91	0.88
Language Stimulation	6.46	6.71	0.25
Physical Environment	6.08	6.21	0.13
Warmth & Affection	5.13	6.21	0.13
Academic Stimulation	4.07	4.42	0.35
Modeling	3.19	3.20	0.01
Variety in Experience	6.90	7.35	0.45
Acceptance	3.25	3.45	0.20
Total	42.13	44.52	2.39
Sum Score: Stimulation	35.67	37.88	2.21
Sum Score: Discipline	6.44	6.64	0.20
Concepts of Development:			
Perspectivistic	1.94	2.01	0.07
Categorical	.99	.98	-0.01
Total	1.97	2.01	0.04
P. Locus of Control	1.23	1.25	0.02
Com. Life Skill Scale	9.48	10.11	0.63

*Normal-Curve Equivalents (NCEs)
**Developmental Level

from pre to post on the Categorical Scale of the Concepts of Development Questionnaire should be interpreted as growth in parent's ability to express transactional explanations for children's behavior. Parents scoring lower on the Categorical Scale are assumed to be less rigid in their perspective of child development and more flexible in their interpretation of children's behavior. Also, of the child measures, the PBS showed small gains across sites. Although it is difficult to compare scales because the scores are based on different scoring systems, the increment on the PBS is small: only 8% change in raw score points.

Analyses Techniques. This research measured a large number of variables in order to characterize the actual services delivered by the different Head Start program models. Similarly large numbers of variables were recorded to describe **child performance** and the **home environment**. The strategy employed in this analysis was to organize the data into blocks of variables which are considered jointly as indicators of underlying "latent variables" (LVs). The analyses adjusted for a set of Head Start pretest measures including IQ, family functioning, and similar defined variables for child performance. (See the Technical Report, Edgar et al., 1992, for more detail.)

The variables considered under **child performance** included: Preschool Behavior Rating Scale, Cooperative Preschool Inventory, Head Start Measures Battery - Math and Reading, and the Peabody Picture Vocabulary Test. The variables considered under **home environment** included: the Home Observation for Measurement of the Environment, Concepts of Development Questionnaire, Parental Locus of Control, and Community Life Skills Scale.

A Partial Least Squares (PLS) technique (Wold, 1975) was used to perform the analysis. See the Technical Report (Edgar, et al., 1992) for more specific detail.

Program Characteristics. Although the major variable for program was considered to be the model type (e.g., center-based, combination, home-based), a number of additional program characteristics were also considered. These included teacher credentials, class size, home-visitor credentials, home-visit case load, and parent participation. These variables were analyzed separately, rather than as a latent variable.

F. Primary Question

Do variations-in-attendance models achieve the same outcomes as center- and home-based models?

At the end of the Head Start year, there were no significant differences in **child performance** gains associated with the various models. Figure 2 shows the mean performance of children from the 12 programs on the child outcome variable after statistical adjustment for pre-measures. The differences in gains registered among the six program models were not statistically significant. Thus, the variations-in-attendance models were at least comparable to the center-based and home-based models on **child performance**.

Figure 2 LV.S1 Adjusted Child Performance Outcome Means vs. Model

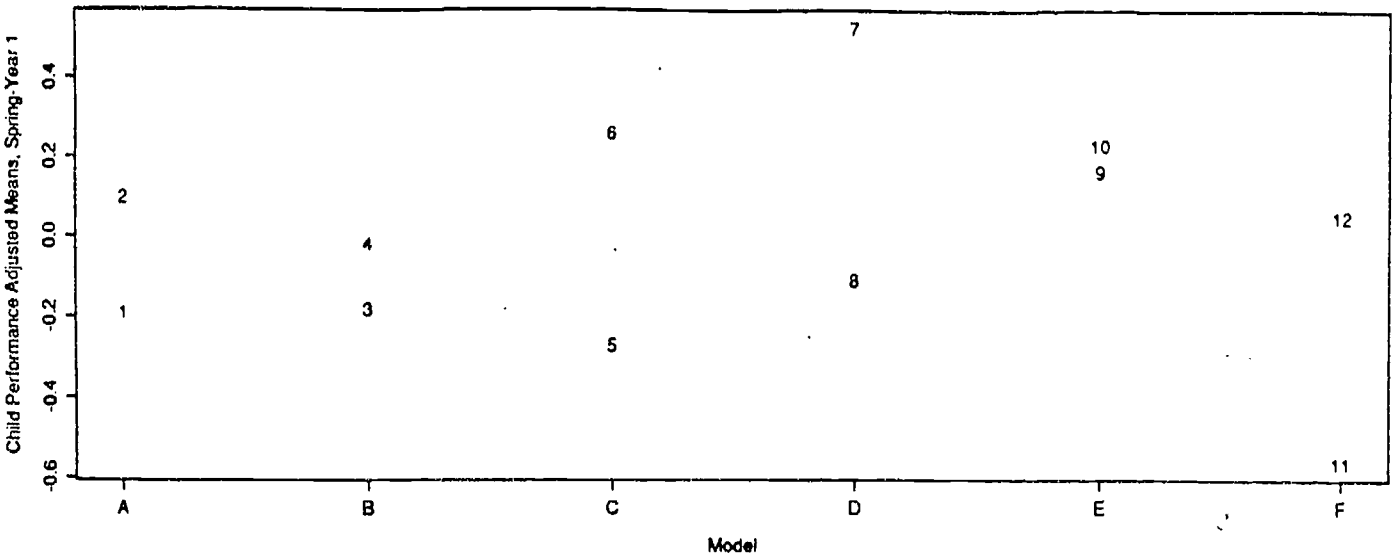


Figure 3 HOME Environment (HLV.S1) LV Adjusted Outcome Means vs. Model

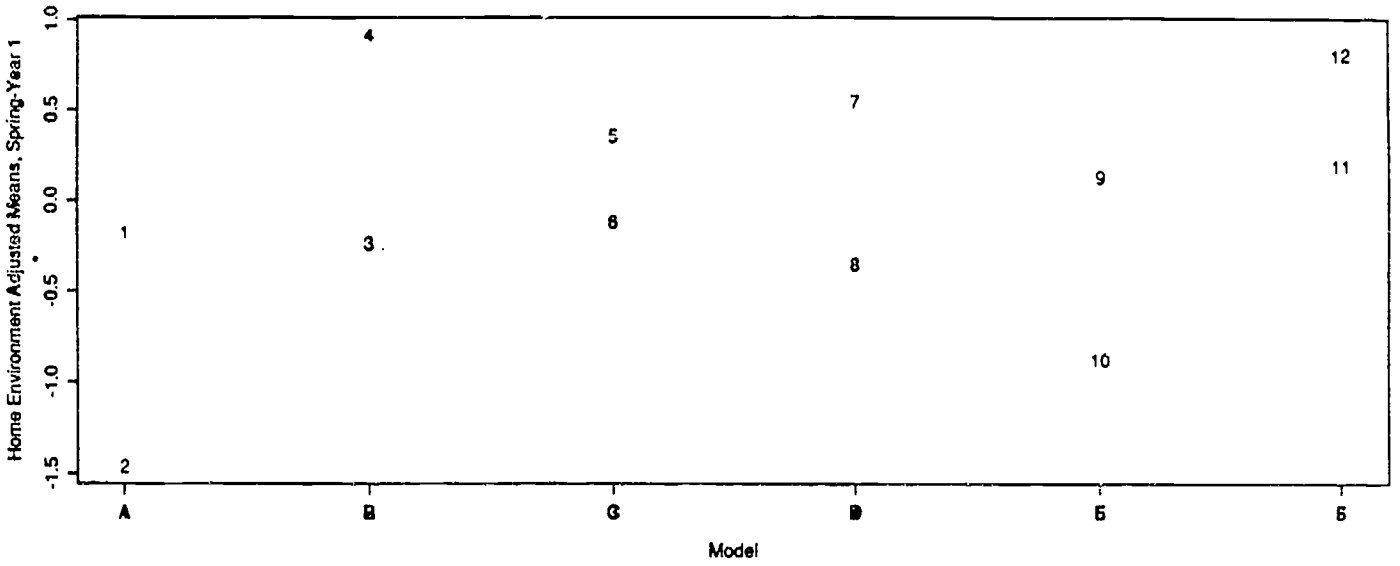
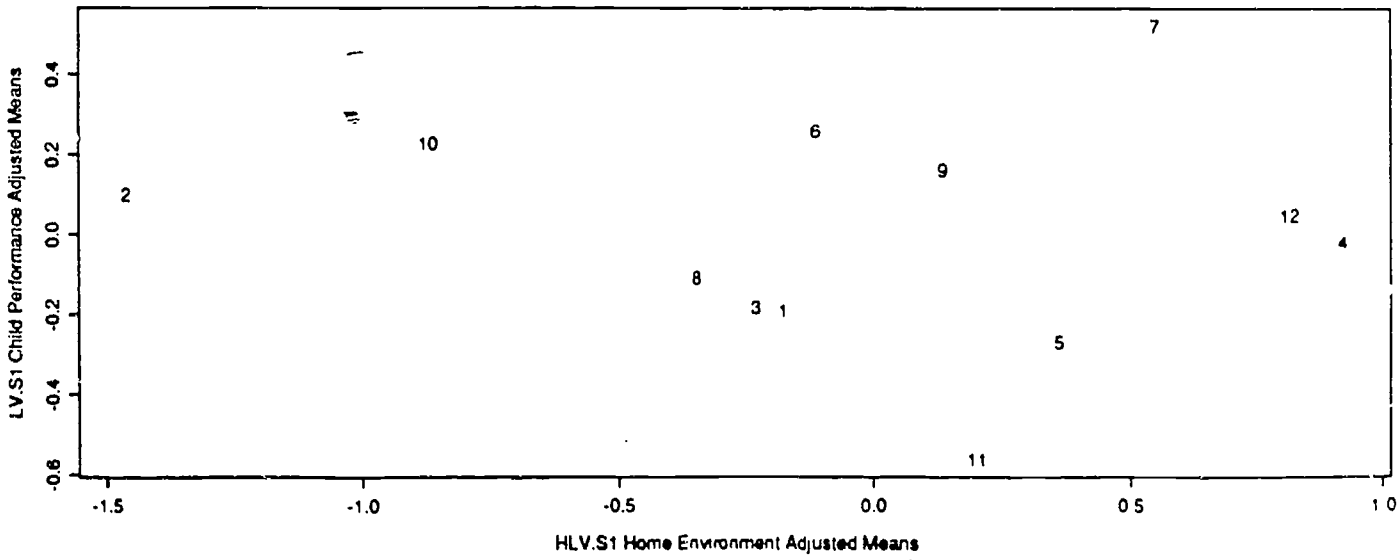


Figure 4 HOME Environment (HLV.S1) vs. Child Performance (LV.S1) Adjusted Means



At the end of the Head Start year, there were no significant differences in the child's **home environment** associated with the various models, as indexed by the home environment latent variable.

Figure 3 displays the improvements in home environment for the 12 programs in the six model areas. Although not significant, the home-based models obtained the highest gains.

G. Secondary Questions

1. Do improvements in the **home environment** result in improved **child performance**?

At the end of the Head Start year, gains in the **home environment** did not appear to be related to their effects on **child performance.**

Examination of Figure 4 shows the mean improvement on the **home environment** and **child performance** measures. At the program level there did not appear to be a relationship between gains in the **home environment** and **child performance.** For example, program 11, which evidenced a rather large gain in **home environment** had the lowest gain in **child performance.** Program 10, with a rather large gain in **child performance**, had the second to lowest gain in **home environment.**

2. Do programs operating within similar models produce equivalent gains in **child performance**?

At the end of the Head Start year the two programs within a given model produced unequal gains in **child performance** (Figure 2). The exceptions to this finding were Model B (Center-Based, 4 center visits a week, 8 home visits a year) and Model E (Variation-in-Attendance, 2 center visits a week, 16 home visits a year).

3. Do programs operating within similar models produce equivalent gains in **home environment**?

At the end of the Head Start year, gains in the **home environment** did not cluster according to model (Figure 3). There were significant differences at the program level with program 12 (32 home visits a year) showing the largest gains in **home environment** and program 2 (4 center visits per week, 2 home visits per year) showing the smallest gains.

H. Summary, Year One Findings

This study set out to determine if the program variables of number of center visits and number of home visits had a direct effect on child performance and/or home environment. The analysis of other program variables found only one relationship to either **child performance** or **home environment:** children tended to make higher gains in reading when their teachers held a BA degree. On the other hand, children made larger

gains in social skills when their teachers had CDA credentials. Unfortunately, these findings were confounded by type of program model (teachers with BAs tended to be in center-based programs). The results indicated that these program variables accounted for a very small difference in child performance and home environment. Additionally, the differences in outcomes were not consistently the same for programs with similar service delivery models.

At the end of their first year of study, Peters, Bollin, and Murphy (1991) reported that short-term child achievement gains were not significantly affected by the mode of Head Start delivery. However, parents in the different programs demonstrated differential gains: in the traditional center program, indirect parent effects were negligible or negative; in the mixed and home-based programs parent effects were positive. One possible explanation for the lack of the effects obtained by Peters et al. (1991) in the present study is the low rate (69%) of home visits actually completed by the home-based programs and the possible effect of unemployment and minority students, which were high in the home-based programs.

IV. YEAR TWO RESEARCH

This section presents information on the research methodology for the second year of the study and effects achieved at the end of kindergarten by the Year One children. In Year Two the same primary and secondary questions were addressed.

A. Outcome Measures

In selecting **child performance** and **home environment** measures for the Year Two follow-up evaluation, the research team considered the following factors: consistency of skills and knowledge areas assessed from Year One to Year Two; developmental appropriateness for kindergarten level; psychometric properties of test instruments; and ease of administration. Given these considerations several measures were dropped and others added.

1. Child Performance

MAPS-K Developmental Assessment Scales (Reading & Math Subscale) (Bergan, Feld, & Schwarz, 1990). The primary measure of academic (reading and math) achievement for Year Two is the MAPS-K, the kindergarten version of the Head Start Measures Battery. MAPS-K was normed in 14 states, on approximately 3,600 children across different socio-economic groups. In addition to complementing the Head Start Measures Battery in content, test construction, and score reporting, MAPS-K is highly correlated (+.80) with other standardized achievement tests (e.g., Metropolitan Achievement Test, Wide Range Achievement Test). Moreover, because MAPS-K is based on latent trait modeling, the problem of discriminating skill levels at the lower end of the test (floor effects) is reduced.

The Walker-McConnell Scale of Social Competence and School Adjustment (Walker & McConnell, 1988). The Walker-McConnell is an established teacher rating scale which measures children's classroom behavior in a 43-item Likert-type scale. There are three subscales (teacher-preferred behaviors, peer-preferred behaviors, school adjustment) and a total score. The Walker-McConnell was used as a measure of children's social competence and school adjustment.

The Pictorial Scale of Perceived Competence and Acceptance for Young Children (Harter & Pike, 1980). Subscales include Cognitive Competence, Physical Competence, Peer Acceptance, and Maternal Acceptance. The scales assess children's domain-specific self-judgments of their competence.

School Records. Indices of school success, a primary measure of early childhood intervention efforts, include attendance, promotion to first grade, referral for special services, placement in special services, and a 5-point overall teacher rating scale.

2. Home Environment

Intake/Exit Interviews. The interviews assess families' socio-economic status, using the same indices assessed in Year One: income level, education, and employment.

Home Observation for Measurement of the Environment (HOME) (Caldwell & Bradley, 1984). This instrument is used widely in research studies and evaluations of parent-child interventions. It requires a one-hour interview/home visit to record information about the home environment, parent-child interaction, and caregiver responses. (See page 10.)

Concepts of Development Questionnaire (Sameroff & Feil). This questionnaire requires the caregiver to respond to statements regarding beliefs about child behavior. It measures a parent's attributions of child behavior.

Community Life Skills Scale. This scale is intended to measure the degree of support available to the caregiver. Two subscales, support services and support involvement, were used for this evaluation.

B. Data Collection Procedures

A team of trackers was established at each of the 12 sites. The trackers were each assigned 7-10 families. Their responsibilities were to: maintain ongoing contact with each family; inform families of the purpose of the study; obtain written permission to contact the child's kindergarten; update the family intake questionnaire in the fall of 1989 and spring of 1990; test the child on the MAPS-K and Pictorial Scale of Perceived Competence in the fall of 1989 and spring of 1990; inform the children's kindergarten teacher of the study; provide the teachers with the Walker-McConnell Scale forms and school record forms; collect the completed forms from the teachers in spring 1990; and arrange for the HOME observations. The trackers were recruited from the pool of Year One data collectors. All trackers took part in a one-day training session in which they were trained in the administration of the MAPS-K and Pictorial Scale of Perceived Competence, received forms for teachers, were trained in techniques for maintaining contact with the family, and were provided with materials for the project. Each site had a team leader responsible for maintaining contact with all trackers and the Washington Research Institute (WRI) research office.

The same individuals who conducted the HOME observations during Year One (primarily Public Health nurses, all of whom had received training in the HOME and who had obtained satisfactory reliability with one another) were contracted to administer one HOME observation, the Concepts of Development Questionnaire, and the Community Life Skills Scale in November, 1989.

All data were returned to the WRI office where the protocols were checked and, when needed, trackers were contacted to clarify or add information. Data were entered into a computer program and were prepared for data analysis by WRI staff.

V. IMPACT RESULTS - YEAR TWO

Child performance at the end of kindergarten consisted of a single latent variable that summarizes: (1) performance on reading and math scales of the MAPS-K Developmental Assessment Scales; (2) teachers' ratings of children's social skills and school adjustment on the Walker-McConnell Scale of Social Competence and School Adjustment; and (3) children's self ratings on the Pictorial Scale of Perceived Competence and Social Acceptance. All three measurements that contribute to this child outcome latent variable were collected twice, once at the beginning and once at the end of the children's kindergarten year. The analyses adjusted for a set of Head Start pretest measures including sex, IQ, family functioning, and a similarly defined latent variable summarizing child performance (pretest measures on child performance).

The variable considered under **home environment** is also a latent variable which summarizes: (1) parents' knowledge of child development based on their responses to the Concepts of Development Questionnaire, or CDQ; (2) the degree of support available to caregivers, based on parents' answers to the Community Life Skills, or CLS; and, (3) ratings of the children's home environment by observers who employed the Home Observation for Measurement of the Environment, or HOME. The CDQ and CLS information was collected at the end of the kindergarten year, and the HOME information was obtained in November of the kindergarten year. The analyses adjusted for the same latent variable as measured prior to Head Start, so adjusted mean scores are reported.

A. Primary Question

Do variations-in-attendance models achieve the same outcomes as center- and home-based models?

At the end of the kindergarten year there were differences in **child performance** gains associated with the various models. Figure 5 shows the mean performance of children from the 12 programs on the child outcome variable after statistical adjustment for pre measures. The differences in the gains registered among the six program models were statistically significant. The better performing models were the center-based model (A), the enhanced center-based model (B), and two combination models (D and E). The poorer performers were a combination model (C), and the home-based model (F).

Differences among the four better performing models (A, B, D, and E) were not statistically significant. That is, although models B and D appeared to produce somewhat higher child gains than models A and E, that difference is not statistically significant. Thus, most combination models, with the exception of Model C, yielded post-kindergarten outcomes that were at least comparable to those of center-based models.

At the end of the kindergarten year, Head Start Program models did not differ in their impact on the child's **home environment**, as indexed by the measures employed in this study.

Examination of Figure 6 displays improvements in the home environment that were registered by the 12 programs.

B. Secondary Questions

1. Do improvements in the **home environment** result in improved **child performance**?

At the end of the kindergarten year, gains in the **home environment** did not appear to be related to their effects on **child performance**. This was similar to the Year One finding. Examination of Figure 7 shows the mean improvement for each program on the home environment and child outcomes. At the program level, there appeared to be no relationship between home environment and child outcome. That is, a program that yields larger improvements on the home environment was no more likely to show better child outcomes than a program that yielded less favorable effects on the home environment.

The study also examined the relationship between changes in the home environment and changes in the child, without considering the program in which the child was served.

There was essentially no relationship between changes in the home environments and changes in children's achievement ($r = 0.08$). Children whose home environments showed greater improvements did not show appreciably more improvements in learning and psychosocial development. Thus, there is no clear evidence of a relationship between relative changes in the home and relative changes in child performance, as measured by the instruments employed in this research.

2. Do programs operating within similar models produce equivalent gains in **child performance**?

At the end of the kindergarten year the two programs within a given model produced equivalent gains in **child performance** as measured by the latent variable (Figure 5).

However, referrals to special education during the kindergarten year were not consistent between programs within the same model. Using a logistic regression, it was determined that child performance at entrance to the Head Start program was significantly correlated to referrals to special education. That is, children who entered Head Start with lower pretest scores were more likely to be referred to special education. When the referrals are adjusted with this premeasure, programs 6 and 11 show significantly higher probabilities to refer to special education (see p. 84, Technical Report, Edgar et al., 1992).

3. Do programs operating within similar models produce equivalent gains in **home environment**?

At the end of the kindergarten year, gains in the **home environment** did not cluster according to model (Figure 6). There were significant differences at the program level with Program 12 (32 home visits a year) showing the largest gains in **home environment** and Program 2 (4 center visits per week, 2 home visits per year) showing the smallest gains.

Figure 5 LV.S2 Adjusted Child Performance Outcome Means vs. Model

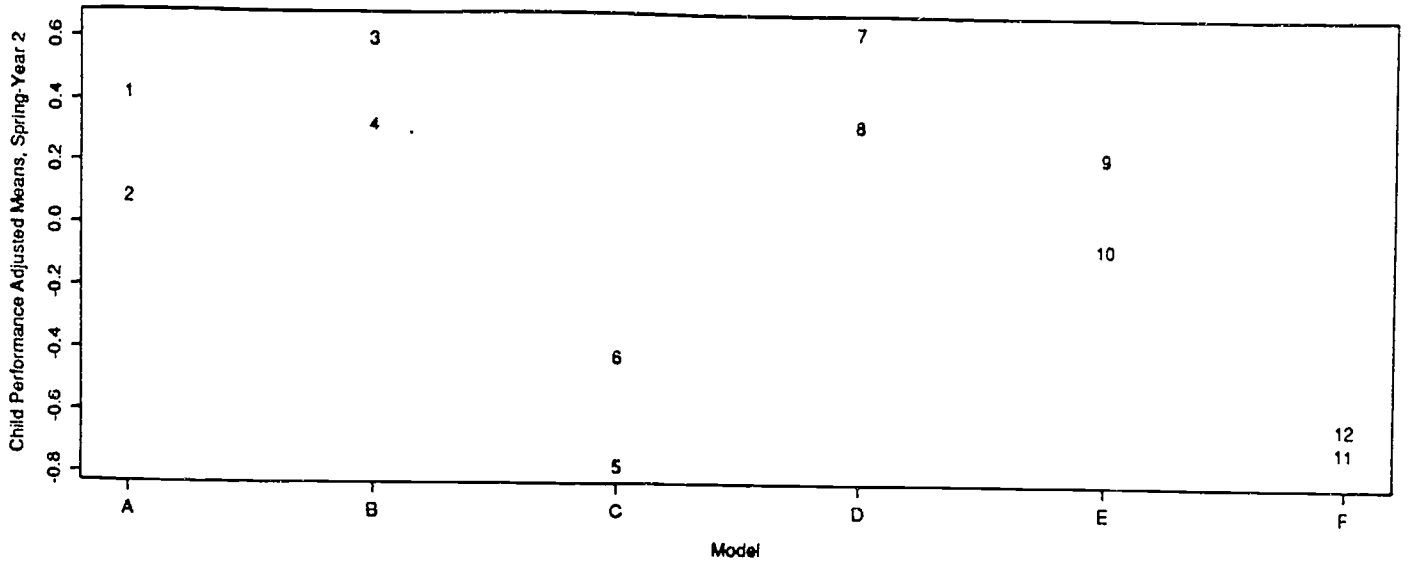


Figure 6 HLV.Y2 Adjusted Home Environment Outcome Means vs. Model

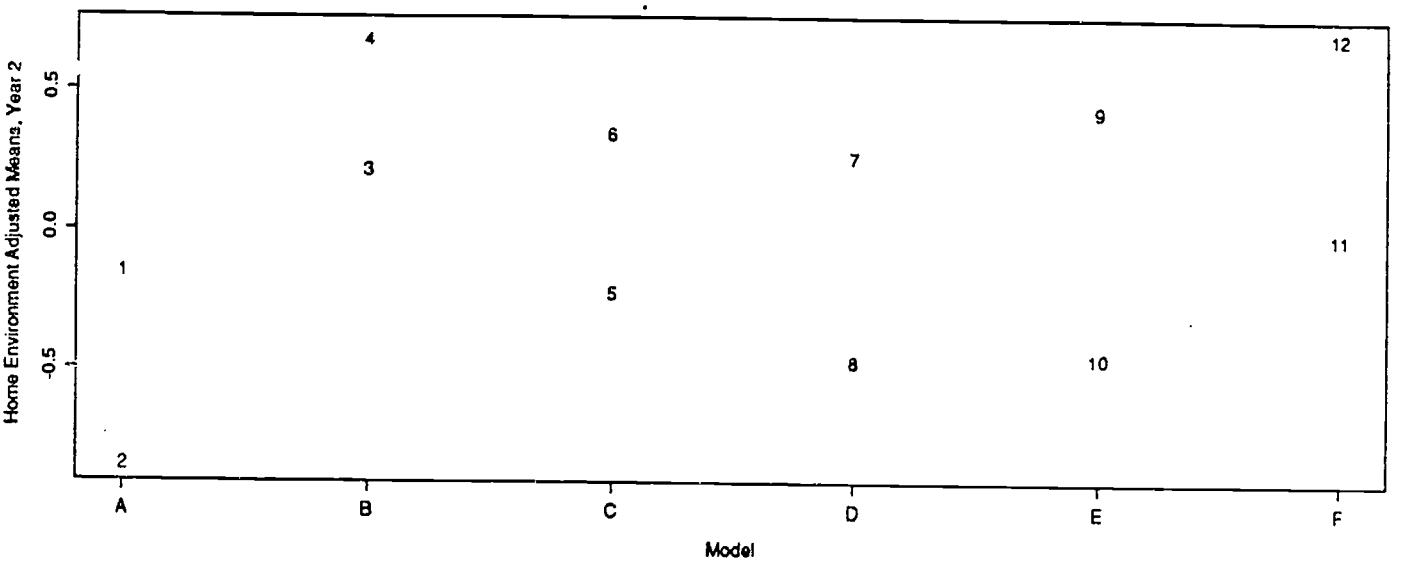
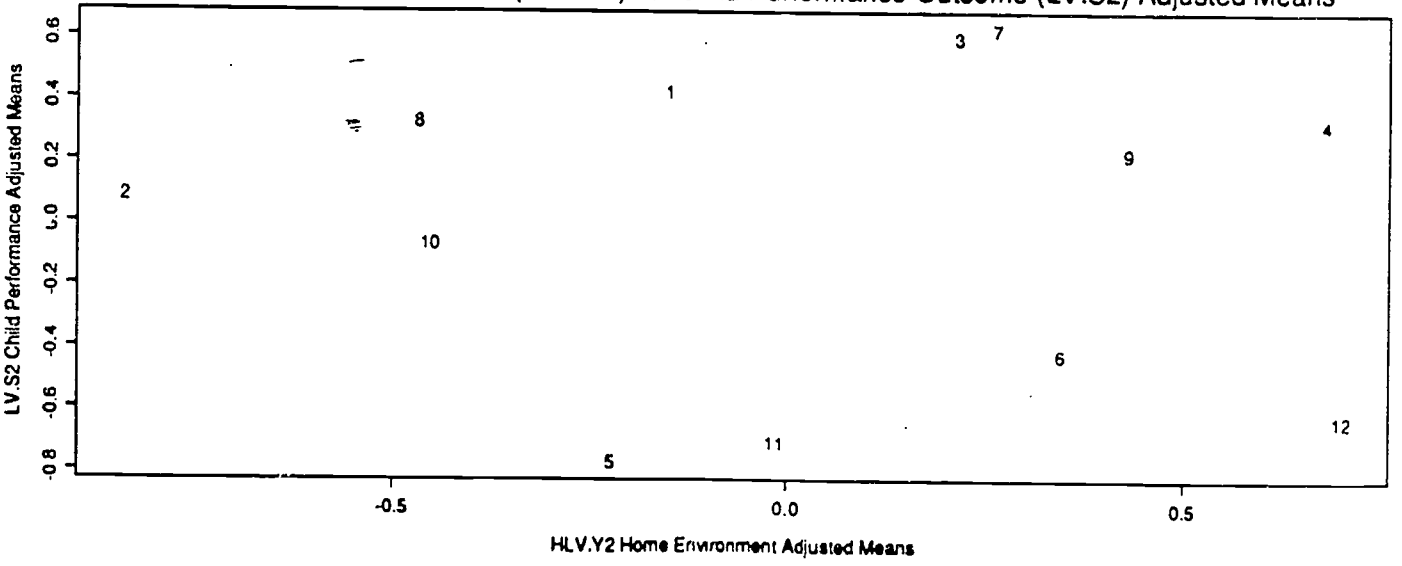


Figure 7
HOME Environment Outcome (HLV.Y2) vs. Child Performance Outcome (LV.S2) Adjusted Means



VI. DISCUSSION

A. Summary of Findings

The primary purpose of this study was to determine if the variations-in-attendance programs achieved results comparable to those of center-based or home-based programs. Based upon follow-up through kindergarten, the answer to this question is yes, variations-in-attendance programs are comparable to center-based and for the most part comparable to home-based models. Consequently, the number of center visits and the number of home visits do not appear to be the crucial variables that account for skill gains by children or changes in family functioning.

However, by themselves, home and center temporal variables may in fact be quite significant in the presence of more intensive and effective instructional strategies or family interventions. For example, consider a hypothetical curriculum approach that involved 30 minutes of daily systematic teacher-led prereading experiences requiring skilled teaching techniques. In a case like this, temporal factors such as number of days children receive teacher-led instruction could very well determine whether the approach succeeds in improving children's readiness for school. Similarly, the success of a specific home intervention program that required intensive parent training or services to parents might be significantly affected by temporal factors, such as the number of home visits, and by the skill level and training of the home visitor. Further research on these qualitative issues is needed. For example, preliminary findings from a study by Bergan, Sladeczek, Schwarz, and Smith (1989) found that kindergarten teachers who employed a systematic measurement and planning system were successful in significantly increasing the math and reading scores of their students as compared to a control group. In addition, the students of the experimental groups were less likely to be placed in special education than were control group students who had not reached similar levels in math and reading. Bergan et al.'s (1989) study explored qualitative aspects of classroom instruction which influence child skill gains and later success in school. It is a good example of the type of research needed to identify specific methods of child and parent intervention that are related to enhanced child development and parent functioning.

Based on the above discussion it is therefore hypothesized that other quality indicators of the program, such as content of instruction, instructional methodology, staff competence, content of home visits, or methods of interacting in supporting families may be more powerful in explaining gains in child performance and home environment than the number of home or center contacts in explaining improved child performance or family functioning. For example, we noted that there was a relationship between the credentials of Head Start staff and child performance. The issues of developmentally appropriate curriculum and appropriately trained staff need to be seriously considered in evaluating program effects in future Head Start research.

Qualitative data on the expectations and attitudes of Head Start staff, from directors to classroom aides, also need to be examined, as these expectations undoubtedly have an impact on program outcomes. Studies to date have rarely addressed how Head Start

staff value learning, what expectations they hold for children and families from different backgrounds, what they expect every child can learn, and what they believe they can do to influence children's learning. These attitudes are important, yet difficult to measure, qualitative aspects of programs. For example, there was a wide range of staff attitudes among the programs as to who has the primary responsibility of educating the child (Head Start staff or parents). While these data did not cluster by program type (see Appendix E of Technical Report, Edgar et al., 1992), there is an indication this type of information could have substantial effects on outcomes. Ethnographic studies of effective Head Start programs could begin to provide this type of information.

B. Future Research

This study offers several specific suggestions for future researchers. First, measures of instructional procedures which occur during center visits need to be part of any future study. Functional definitions of "developmentally appropriate" curriculum and instruction need to be developed so fidelity of treatment measures can be obtained and correlated to child performance gains.

Second, similar procedures must be developed to measure home visit activities. This study team developed a crude measure of home visit activity that was a self report by the home visitors on the number of minutes they engaged in various activities. Conceptual formulations of what should be accomplished during home visits need to be developed and field tested. This should be followed by the development of fidelity of treatment measures for this activity.

Third, researchers need a measure of family support activities which assesses the family in providing a developmentally appropriate environment for their children. Experience in this study indicates that a count of family visits or a listing of activities does not provide a sensitive measure of family support.

Fourth, it was surprising to find no relationship between home environment and child performance. The research team was never satisfied with the measures selected for this study, but were unable to find better ones. It is believed that parental knowledge of child development, especially as related to how parents can (and need to) relate to the needs of their children in a developmentally appropriate manner, is very important. The research team is less certain that the Concepts of Child Development and the HOME measures are sensitive measures of this trait. It is believed that individual family member dysfunction (drug or alcohol abuse, family violence) and the insidious impact of poverty significantly influence parent-child interaction. Study measures of these aspects of the home environment were very crude. In addition, our study was unable to specify the role of parents in the education of their child. Year 1 findings seem to indicate that the parents' role is important, whereas Year 2 findings were less clear. The field urgently needs more sensitive home environment measures.

Based on study findings, the researchers encourage the Head Start Office to seriously consider commissioning the development of home environment measures. Using the

development of MAPS as a model, Head Start should take the lead in developing adequate measures of the home environment. These measures are especially needed in national longitudinal studies of Head Start.

Fifth, any study of Head Start must focus on longitudinal measures of both child performance and home environment. Ideally, this study should have extended through at least the end of fourth grade in order to establish child success in school. One- or two-year studies simply cannot answer the more important questions of the impact of Head Start on child and home environment over time in public school.

Long-term outcomes for children are probably due to a complex interaction of innate factors, home environment, and educational experiences. As early intervention programs become more refined, researchers will be more likely to identify the quantitative and qualitative aspects of programs that influence child development and parent involvement.

Sixth, when conducting a longitudinal study of this nature, measures of the post-Head Start school programs need to be included. For example, this study did not measure the content and intensity of the kindergarten curriculum. Thus it is not possible to tell if child performance at the end of kindergarten is a function of the kindergarten instruction. Likewise, it is not possible to determine the contributions of post-Head Start parent education and support services to the functioning of Head Start families.

Just as qualitative analysis of the Head Start instruction is needed, similar measures need to be made on the kindergarten and elementary instructional practices. The content of the curriculum, type of instructional methodology, intensity and duration of instruction, and fidelity of curriculum implementation need to be measured in these post-Head Start settings in order to determine the effects of these instructional practices on child performance.

The degree of articulation between the curriculum and instructional methodology of the Head Start program and subsequent school programs should also be measured. As children and families make the transition from one program to another, they often experience radical changes in curricula. It would be expected that children who receive a well designed and implemented program in Head Start and similar high quality programs in kindergarten and first and second grade would experience more academic success than children who encounter poorly designed curricula (Caldwell, 1986). This transition issue is being addressed in a major federal initiative from Head Start, and data from these transition studies should increase understanding of classroom practices and school policies that contribute to long-term outcomes (Woodhead, 1985).

Concurrent with the issue of curriculum continuity is the issue of continuity of family support provided in the post-Head Start settings. There is general agreement (although little data) that the level of family support decreases in post-Head Start settings. Head Start personnel hold the opinion that public schools fail to support and encourage parents' involvement in their child's education. Future studies should measure family

support services and school efforts to maintain family involvement as the child progresses through the elementary grades.

This research team believes the quality of the post-Head Start programs plays a crucial factor in child and family functioning and as such needs to be measured in longitudinal studies of Head Start. Rather than assuming that one or two years of Head Start experience are sufficient to enable children and their families to overcome the effects of poverty, ongoing appropriate curriculum and instruction, supplemented by continuous family support are necessary to prepare children to be competent learners and, eventually, successful adults. This formula may be even more true in the economic and social contexts for the Head Start cohorts of the 1990s than it was in the 1960s (Woodhead, 1988). Longitudinal studies of Head Start graduates must carefully attend to the quality of subsequent educational programs Head Start students receive.

Head Start programs have become a fixture in our society. It is good policy to provide young children who are at risk of school failure an opportunity to enter school on an equal footing as their peers. The desire of Head Start personnel to study the effectiveness of their procedures and to continue to refine these procedures based on systematic data is laudable. These studies must have a longitudinal focus and must acknowledge the role of post-Head Start environments on child and family outcomes (Lee, et al., 1988). The long-term outcomes of former Head Start students will be the "proof of the pudding," and a complete picture demands that researchers consider how Head Start program variables interact with subsequent social and educational influences on the child and family.

REFERENCES

Bergan, J.R., Feld, J.K., & Schwarz, R.D. (1990). *Technical manual for the MAPS-K Developmental Assessment Scales*. Tucson, AZ: Assessment Technology Incorporated.

Bergan, J.R., Sladeczek, I.E., Schwarz, R.D., & Smith, A.N. (1989). *Effects of measurement and planning on cognitive development and educational programming for kindergarten children*. Unpublished manuscript, University of Arizona, Center for Evaluation and Measurement, Tucson.

Bredekamp, S. (1988). NAEYC position statement on developmentally appropriate practice in the primary grades, serving 5- through 8-year-olds. *Young Children*, 64-84.

Caldwell, B.M. (1986). Day care and the public schools -- Natural allies, natural enemies. *Educational Leadership*, 34-39.

Caldwell, B.M., & Bradley, R.H. (1984). *Home Observation for Measurement of the Environment*. University of Arkansas at Little Rock, Little Rock, AR.

Clark-Stewart, K.A. (1983). Exploring the assumptions of parent education. In R. Haskins & D. Adams (Eds.), *Parent education and public policy*, 257-276. Norwood, NJ: Ablex.

Edgar, G., Jenkins, J., Sampson, P., Goldstein, D., Blackorby, J., Haynes, M., & Vadasy, P. (1992). *Head Start Research Project: Variations in Service Delivery Models in Region X Technical Report*. Washington Research Institute, Seattle, WA.

Harter, S., & Pike, R.G. (1980). *The Pictorial Scale of Perceived Competence and Acceptance for Young Children*. University of Denver, CO.

Lee, V.E., Brooks-Gunn, J. & Schnur, E. (1988). Does Head Start work? A 1-year follow-up comparison of disadvantaged children attending Head Start, no preschool, and other preschool programs. *Developmental Psychology, 24(2)*, 210-222.

Peters, D.L. (1988). Head Start's influence on parental and child competence. In S. Steinmetz (Ed.), *Family and support systems across the lifespan* (pp. 73-97). New York: Plenum.

Peters, D.L., Bollin, G.G., & Murphy, R.E. (1991). Head Start's influence on parental competence and child competence. *Advances in Reading/Language Research, 5*, 91-123.

Peters, D. L., Bollin, G., Murphy, R., & Berg, M. J. (1988). *An analysis of the effects of three modes of Head Start delivery.* Unpublished manuscript. University of Delaware, Department of Individual and Family Studies.

Sameroff, A.J., & Feil, L.A. *Concepts of Development Questionnaire.* University of Illinois at Chicago Circle.

Valentine, J., & Stark, E. (1979). The social context of parent involvement in Head Start. In E. Zigler & J. Valentine (eds.), *Project Head Start: A legacy of the war on poverty* (pp. 291-314). New York: Free Press.

Walker, H.M. & McConnell, S.R. (1988). *The Walker-McConnell Scale of Social Competence and School Adjustment.* PRO-ED, Austin, TX.

Wold, H. (1975). Path Models with latent variables: The NIPALS approach. In H.M. Blalock et al. (Eds.), *Quantitative sociology: International perspectives on mathematical and statistical modeling,* (pp. 307-357). New York: Academic Press.

Woodhead, M. (1985). Preschool education has long-term effects: But can they be generalized? *Oxford Review of Education, 11,* 133-155.

Woodhead, M. (1988). When psychology informs public policy: The case of early childhood intervention. *American Psychologist, 43,* 443-454.