



*The Consultative Group on Early Childhood Care and Development*

# EFFECTS OF EARLY CHILDHOOD INTERVENTION ON PRIMARY SCHOOL PROGRESS AND PERFORMANCE IN THE DEVELOPING COUNTRIES: AN UPDATE

by Robert G. Myers

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A FRAMEWORK FOR EXAMINING EFFECTS OF EARLY INTERVENTION PROGRAMMES ON WHAT HAPPENS IN SCHOOL...	2
AN EXTENSION OF THE FRAMEWORK: THREE APPROACHES TO INTERVENTION...	4
ASSESSING THE EVIDENCE: A SUMMARY OF FINDINGS FROM THE 1985 REVIEW...	6
EVIDENCE FROM THE DEVELOPING COUNTRIES...	7
SUMMARY AND DISCUSSION...	19
REFERENCES...	22

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This paper draws from and builds directly upon: Robert Halpern and Robert Myers, "Effects of Early Childhood Intervention on Primary School Progress and Performance in the Developing Countries," Ypsilanti, Michigan, The High/Scope Educational Research Foundation, April 1985.

## *A Framework for Examining Effects of Early Intervention Programmes on What Happens in School*

Improved primary school progress and performance is one of the hoped-for outcomes in many programmes of early intervention. That outcome accompanies and overlaps such other important purposes as improving children's physical health, providing child care for working parents, rehabilitating children who are disabled, inculcating particular moral, political, or religious values, and generally improving children's quality of life.

Although it is only one among many desired outcomes, the potential effects on schooling of early intervention programmes capture the attention of policy makers and planners seeking ways to increase educational performance and reduce costs through reduced repetition and dropout. And parents often expect these programmes to give their child a "headstart", easing the transition from the social world of the home to that of the school and the larger society. Whether or not intervention programmes indeed produce the desired schooling effects is therefore a critical question. It would also be useful to know which programmes do have effects, and what the financial and social costs are of these effective programmes. These are particularly pressing questions in the context of the dramatic social and economic adjustments that have occurred in recent years. (Cornia, Jolly and Stewart 1987)

For children from poor families in developing countries, evidence continues to slowly accumulate about effects of early childhood intervention programmes on primary school progress and performance. The purpose of this paper is to provide an update on that evidence. A review paper by Halpern and Myers in April 1985 provides the starting point. That earlier review sets out a framework for examining the causal logic of investment in early childhood programmes, and includes a selective examination of basic research, meant to illuminate that logic. However, the focus of the 1985 review and of this update is on results of planned interventions designed specifically to enhance the physical, mental, and/or social development of a child in the early years, from birth to six of age. The interventions examined are diverse, ranging from small-scale nutritional supplementation and stimulation programmes beginning at birth and involving home visitors, to large-scale public programmes of center-based preschool education for children from 4 to 6 years of age. All programmes reviewed focus on service to poor families.

In this update, the framework used in the earlier paper will first be discussed and extended. Then a summary of evidence reviewed in 1985 is followed by presentation and assessment of additional evidence from studies and interventions carried out in Turkey, India, Nigeria, Brazil, and Colombia. The paper ends with a restatement of conclusions.

A long chain of events links early development with adult outcomes such as employment, productivity, social participation, and family formation. With increasing frequency, one of the major events in the sequence is participation in school. One representation of this chain of events can be summarized from the 1985 paper by Halpern and Myers which suggests that enrollment, progress, and performance in school are influenced both by the cognitive and social characteristics a child brings to the school and by the availability and quality of schooling. Either

or both of these sets of variables can favor or present obstacles to successful school enrollment, adjustment, progress, and achievement. In this review we are particularly interested in a child's cognitive and social characteristics, which are shaped by nutritional and health status, and by child rearing goals and practices. These, in turn, are influenced by the particular family and community situation in which the child lives and by the larger social and economic context.

Even while focussing on early intervention programmes designed to affect what children bring to school (as contrasted with interventions designed to improve primary schools), the framework, backed by a wealth of research results, leads to the position that programme decisions about early childhood intervention and about improvements in primary schooling should be considered together, not separately. Investment in children before they arrive at school helps to maximize the investments made in school, especially if there is continuity between the two in purpose, philosophy, and pedagogy. The review of programme evaluations in 1985 strongly reinforced that conclusion and policy implication. This update will provide additional support for considering early interventions and primary school interventions together.

***A Note on Nutrition, Health Status, and Childrearing Patterns.*** Since the original paper was written in 1985, a number of excellent studies and reviews have appeared that further illuminates various parts of the framework. Of particular note are several reviews that reinforce the importance of nutritional status in the chain of events, linking nutrition synergistically to both health and psychosocial development, particularly as affected by caregiver/child interactions.

In a compact, well-documented review titled, "Beyond Survival: Children's Growth for National Development," McGuire and Austin (1987), focus on growth promotion, and include sections on mental development, intelligence and school behavior, school enrollment, and grade completion and repetition. The authors conclude that, "Better growth is associated with better pre-school and school-age IQ. It is also associated with learning-relevant behavior, early enrollment in school and better school achievement, all of which enhance the educational efficiency of an economic return on primary schools." (16)

Another nutrition-related review, by Zeitlin and Mansour (1986), looks at reasons why some children who live in conditions putting them at high risk of becoming malnourished, nevertheless manage to thrive nutritionally. The review supports the view that feeding is a social and developmental process as well as a nutritional one. It helps to establish the importance of the relationship between parental childrearing goals and practices and "child nutritional and health status." A mother needs to know how to interact with a baby. And, "The baby's ability to make its desires known and to respond to feeding opportunities offered by the mother in a manner that is not apathetic, excessively distracted, or self-assertively rejecting, may effect its growth." (Zeitlin and Mansour, 61) These observations are also supported strongly in longitudinal research carried out in a rural Mexican community by Adolfo Chavez and Cecilia Martinez (1981).

Another area of nutritional research, slighted in the 1985 paper, links micro-nutrient deficiencies to children's cognitive and social characteristics and beyond, to their performance in school. Increasingly, iodine, iron, zinc, vitamin A, and other micronutrients are recognized as having an important effect on the progress and performance of children in school (Berg and Brems 1986).

For instance, Soemantri, Pollitt, and Kim (1985), investigating the effect of a 3-month iron supplementation intervention on measures of performance among iron-deficient anemic children in an economically deprived rural area of central Java, concluded that, "Changes in the iron status of iron-deficient anemic children were associated with significant changes in their performance on school achievement and concentration tests." (1127)

The evidence describing relationships among nutritional status, health status, and the education or childrearing components of early development strongly cautions against focusing exclusively on early cognitive stimulation or preschool education in programming intended to improve progress and performance in school.

### *An Extension of the Framework: Three Approaches to Intervention*

There are at least three ways in which programming can be approached, each related to a different view of home and school environments and the transition between them. Programmes may be directed toward:

- 1. Compensating for deficits and deficiencies*
- 2. Overcoming differences and discontinuities*
- 3. Recognizing strengths and mobilizing resources*

**1. Deficits and Deficiencies.** The predominant view guiding intervention programmes has been a compensatory one, based on theories of physical, psychological, and social deprivation. This view stresses identification of deficits and deficiencies and leads to actions that compensate for missing elements. In focusing on what is missing, the compensatory view tends to overlook the virtues of common wisdom and local competence. Often this approach leads to placing solutions outside the home by, for instance, providing food supplementation or putting iodine in salt or gathering children together in preschool centers for stimulation.

Deficits and deficiencies are, of course, relative to a set of desired outcomes. For example, if improved schooling outcomes are desired, then a premium may be placed on the ability of a child to speak in a language that is not her mother tongue or to handle abstract concepts and classification skills. If these abilities are not present, the child is labeled as deprived—relative to the school environment. However, if the same child, at home, is expected to speak her mother tongue and to handle classification tasks in concrete situations (please pick the large green leaves), and if she does these well, she is not considered deprived. This relativity of purpose is more important when discussing programmes of early stimulation and socialization than it is when discussing survival or even nutritional status where expected outcomes are clearer and less culturally tied. A compensatory view applied to psychosocial development and tied to a concept of deprivation defined by what is desired in school can, therefore, lead to injustices. That view can also produce a shift in the focus of social responsibility—from the family to institutions outside the home—and may favor solutions that are inappropriate to the particular cultural circumstances.

**2. Differences and Discontinuities.** As the field of early childhood development has evolved, another view, emphasizing differences and discontinuities between home and school environments has begun to replace that focusing on deficits and deprivation. This view does not establish one environment as superior to the other, but rather recognizes that different environments require different skills. Emphasis is placed, therefore, on overcoming discontinuities between home and school. When this view is translated into programme actions in an enlightened way, changes may be sought in the home *and in the school*, in order to buffer possible traumatic effects of discontinuities and to smooth the transition. In practice, however, this approach leads to many of the same results as a compensatory view, emphasizing only changes in the home or leading to creation of a transitional institution that is expected to bridge home and school.

**3. Strengths and Resources.** A third approach to programming, much less frequently taken, places emphasis on *the ability of children to cope* with recognized differences between home and school rather than on overcoming deprivation or smoothing discontinuities in what is desired and practiced at home and in school. Indeed, differences and discontinuities may be functional, providing complementary learning, and helping to motivate children to learn. In this view, a premium is placed on recognizing strengths in the home environment, on mobilizing resources relevant to promoting growth and learning in both home and school, and on "empowering" individuals and communities to act. Credit is given for traditional health and nutritional practices that have positive effects and for learning that occurs in natural and supportive settings. Primary responsibility for building a strong physical, psychological and social base remains in the home and in the community, assisted however by resources and services arriving from outside. From this perspective, the family and community become the focus for action.

In the 1985 review paper, the same attention was given to the important role of parents and the family in providing children with a proper start and in programmes designed to enhance early development. In this updating of information, however, that role, as represented in parental expectations and childrearing practices and patterns, needs even greater emphasis. Parents not only help to determine the initial success of specific interventions, but also bear responsibility for sustaining those effects.

In this updated review of early intervention programmes and their effect on progress and performance in school, it is particularly important to keep in mind the three distinctions that have been made. The point deserves emphasis because the term "intervention" (used in the title and taken from the previous review) implies an action originating outside the home and leads too easily to thinking exclusively in terms of "socially deprived environments," and of "compensatory" programmes.

With this extended framework in mind, we turn now to the evidence found in studies of planned interventions. A summary of conclusions from the 1985 review of programmes will be followed by addition of more evidence.

## *Assessing the Evidence: A Summary of Findings from the 1985 Review*

### ■ EVIDENCE FROM THE UNITED STATES

Their 1985 review of programme interventions in the United States led Halpern and Myers to the following conclusions:

■ **Prenatal and infant interventions.** "Evidence from reviews of these [prenatal and infant intervention] programs suggests that they do have beneficial short-term effects on parent childrearing behaviors and coping skills, and somewhat less consistently on pregnancy outcomes, infant health and development." (Anderson, Fox and Lewin 1983; Halpern 1984; White and Castro 1984) Only a few prenatal and infant intervention programs have followed children into their school years (e.g., Epstein and Weikart 1979). The little evidence available suggests that intervention prenatally and in infancy, without continued intervention in the later early childhood years, does not affect school progress and achievement. (15)

■ **Early Childhood Interventions.** "The evidence suggests that in the United States context, small-scale experimental early childhood intervention programs for poor children provide a variety of short-and long-term benefits to participants and to society. When monetarized these benefits exceed costs by a factor of at least 3 to 1. It is uncertain whether more typical early childhood service programs, notably Head Start, have the same magnitude and kinds of effects as experimental programs. Evidence . . . suggests that the kinds of effects obtained are the same, but the magnitude is smaller." (15)

■ **Primary School Interventions.** "With respect to an investment strategy focused on improving the quality of primary school instruction for poor children, in the United States context of a generally well-developed primary education system, the marginal improvements from such extra investment appear to be modest. It does appear, though, that within the K-6 framework, extra investment is more effective in the lower grades than in the higher grades." (15)

Although this evidence of programme effects is encouraging, generalizing from experience in the United States to developing countries is not warranted. Why?

■ "The debilitating health and developmental effects of poverty on young children in developing countries are more powerful and pervasive than the effects of poverty on young children in the United States. Poor children and their families in the developing countries do not have access to the variety of medical, social and income support programs that buffer the effects of poverty for families in the United States. In other words, the preventive and compensatory work that an early childhood intervention program has to undertake in the developing countries are greater than that of a similar program in the United States." (15)

■ "The conditions of schooling in the developing countries—large classes, few instructional resources, often poorly trained teachers, an inadequate number of 'places' in each grade—are such that the newly acquired skills that preschool participants bring to primary school may be

less influential than in the United States in shaping the course of children's school careers. When promotion policies are only loosely tied to children's abilities, when there is no special education to be 'avoided', and when there are resources for only 10 or 20 percent of primary school participants to complete secondary school, positive long-term effects on the course of children's careers found in the United States may not be replicated in developing countries." (15)

■ "Nevertheless, it is reasonable to expect that developing country primary school systems are at least modestly sensitive to the kinds of skills and characteristics children bring with them, and conversely, that children are differentially adaptive (due both to physical health and psychological make-up) to the demands of the school setting. In other words, the causal mechanism at work in the United States context may work in similar ways in the developing countries, albeit much more weakly, and with many more pre-conditions attached. Among these pre-conditions would be relatively greater attention to current health and nutritional needs of children; some minimal level of early intervention program quality; likelihood of enrolling in primary school soon after early childhood program participation; availability of a complete primary school, and at least minimally adequate learning conditions." (15)

#### ■ EVIDENCE FROM THE DEVELOPING COUNTRIES

Having reviewed results from the United States and having discarded direct generalization of these results to developing countries, a major part of the 1985 paper was devoted to reviewing evidence from developing countries. Most of the programmes and studies included took place in Latin America. Three groups of studies were reviewed. The first was a group of experimental nutrition-related interventions with relatively sophisticated designs reflecting academic concerns regarding the effects of protein energy malnutrition on behavioral development. The second group consisted of six evaluations of preschool experiences, both formal and non-formal, and ranging from small-scale demonstrations to municipal or nation-wide programmes. These were non-experimental evaluations of naturally occurring service or demonstration programmes in which programme children were matched with peers who were as similar as possible but for participation. A third group of five studies was included as "programme notes". This evidence came from reports of what appeared to be promising programmes. However, the reports were not of sufficient detail to allow the reviewers to examine in depth the evaluation methodology used.

The 1985 review of evidence from developing countries led to the following conclusions:

■ "The available evidence of the effects of early childhood intervention yields a picture of modest positive effects on initial adjustment to the demands of primary school. The particular mechanisms enhancing this adjustment appear to reflect some combination of earlier age of enrollment, improved school readiness and, more selectively, improved health and energy level (thus, presumably, attendance as well). Changes in parental knowledge and attitudes are hinted at in a few studies, but their contribution to children's initial adjustment is largely undocumented. Only one study reports positive effects on absolute likelihood of school enrollment; most studies had no data on this variable."

■ "The most striking finding suggested by the present review is that structural features of the primary school systems (promotion quotas, teacher attitudes, low quality instruction, resource inadequacies, and so forth) seemed rapidly to overwhelm any early childhood intervention effects. Children's individual abilities and physical integrity still played a role in influencing early school progress in studies reviewed, but within a much narrower and absolutely lower range of variance in possible outcomes."

■ "The evidence is not sufficiently broad or detailed at this point to draw conclusions regarding the kind of early childhood intervention most likely to benefit children (holding quality constant) under the circumstances found in most developing countries. A daily educational program, with nutritional supplementation and health surveillance, were the most common elements of programs reviewed. Since individual studies addressed different questions, the findings across studies were not cumulative with respect to preferred combinations of inputs and procedures."

■ "The evidence discussed . . . reconfirms that for many children in the developing countries the transition to primary school is a difficult one. Both the personal and social costs of this adjustment include continued high primary school repetition and drop out rates, and consequently another generation of functional illiterates, an expanding base of minimally flexible and adaptive human resources, and a reproduction of the survival-oriented parenting that the current generation received." (28-29)

## *Additional Evidence*

The evidence to be presented below complements earlier results by adding cases from Asia, Africa, Latin America and the Middle East, and by broadening the types of interventions reviewed. Some information is added regarding the role of parental expectations and practices (see particularly the Turkish study).

### ■ ISTANBUL, TURKEY

The purpose of this action research project, carried out over a four-year period by Kagitchibasi and colleagues (1987), was to study the impact on the overall development of the child of educational preschool care combined with a programme of parental education and support. Effects of this optimal combination were compared with effects of custodial childcare and home care, each taken alone and in combination with parental education. Accordingly, the 251 children in this project are found in six experimental groups defined by their preschool environment and by whether or not their mothers received supplementary support and training:



1. educational preschool with maternal training	[ED-MT]	N= 27
2. educational preschool with no maternal training	[ED-NMT]	N= 37
3. custodial preschool with maternal training	[CUST-MT]	N= 40
4. custodial preschool with no maternal training	[CUST-NMT]	N= 65
5. children at home with maternal training	[HOME-MT]	N= 23
6. children at home with no maternal training	[HOME-NMT]	N= 59
	Total	N= 251

Each of these six groups was made up of 3-and 5-years-olds (132 and 119, respectively).

The project was carried out in five low-income areas of Istanbul with intact families, most of who were nuclear (74%). Most mothers (75%) were born in rural villages or small towns. The mean years of school attendance by mothers were 5.4. Two-thirds of the mothers worked, many in factories where the educational and custodial preschools were located.

Educational and custodial preschool environments were chosen from existing programmes on the basis of systematic observations (of centers and teachers), and of interviews with staff. Marked differences were evident between preschools classified as "educational" and as "custodial"—in staff/child ratios, in facilities and materials available, and in the approach taken by teacher-caregivers. Children were randomly selected from three educational preschools and the custodial preschools (after dropping out children from families not intact, children of the wrong age, and children who were recent arrivals at the preschool). Once the preschool children were selected, a comparison group of children who came from the same neighborhoods and who matched the preschool children on age, economic, and family criteria but who did not attend preschool was located.

During *year one* of the study (1982-83), all mothers were interviewed, all mother/child dyads were observed at home, all preschool children were observed and tested at the preschool, and home children were tested at home. Baseline data included information about mothers' childrearing practices and patterns and their expectations for their children. Children were tested using a wide range of cognitive, personality, and social methods and measures.

During *years two and three*, mothers of half the children in each preschool environmental setting were provided with training, through bi-weekly home visits by trained para-professionals, and with group discussions led by supervising professional staff in alternate weeks. Cognitive development was fostered using a Turkish adaptation of HIPPY (Home Intervention Program for Preschool Youngsters), a home-based enrichment program, with materials provided for educational activities to improve language, sensory and perceptual discrimination skills, and problem solving. Social and personality development was approached through modeling and discussions of the mother-child interaction, and by supporting mothers in developing their own

feelings of competence, efficacy, and self-confidence. Beginning with the second year (when the 5-year-old group entered school), school grades were obtained at the end of each semester.

In the *fourth year*, children were again observed and tested, and school achievement data were collected.

Over the four years, significant effects of both the educational preschool environment and mother training were found on measures of IQ and other measures of mental ability and cognitive skills as well as on school achievement. Preschool environment and home training effects were additive. Results are summarized as follows:

The ED [Educational Preschool] group showed a significantly superior performance on 23 of the measures reported and a nonsignificant, but positive, trend on five of them. By contrast, the CUST [Custodial Preschool] group showed a significantly superior performance on only 3 of the measures, while the HOME group never had the highest score. Likewise, the MT [Maternal Training] group was superior to the NMT [No Maternal Training] group on 12 of the measures and showed a nonsignificant but positive trend on 15 of them, while the NMT group was in no case significantly superior. (52)

Results for personality and social development were not so clear, with few statistically significant findings related to preschool environment or to training. Bi-modal distributions complicated the interpretation of autonomy/dependence measures. There was no difference among groups in school adjustment. The MT groups were, however, significantly less aggressive than the NMT groups.

With respect to the mothers:

The mother training program appears to have made a considerable impact on the mother's style of interaction with the child, leading to a style that is generally more focused on the child, more verbal, less punitive, more cognitively stimulating, and more supportive of the child's developing autonomy. (61)

In addition, different outlooks and patterns of family interaction were found with MT mothers more optimistic and more likely to share in decisions and activities with their spouses.

Regression analyses were run on the academic average of children, and on their grades in mathematics and Turkish in the fourth year of the study (third year of primary for 5-year-olds and the first year for 3-year-olds). The results indicated that preschool environment, a comparatively high level of environmental stimulation (as measured by an environmental stimulation index derived for each home), and the mother's expectation of competence from the child, are the variables most strongly and consistently related to academic achievement as reflected in school grades. (65-6)

## ■ INDIA: THE PROGRAMME OF INTEGRATED CHILD DEVELOPMENT SERVICES (ICDS)

The Integrated Child Development Services (ICDS) programme started in 1975-76 in 33 experimental areas. Focussed on tribal, rural, and urban marginal areas, the scheme was designed

to render supplementary nutrition, immunization, health check-ups, health and nutritional education, and non-formal pre-school education to children under 6 years and to women of child-bearing age, especially pregnant and lactating mothers. The service now reaches several million children and mothers, mainly through *anganwadi* centers (literally, courtyards) where para-professionals are charged with providing early education to groups of children ages 3 to 6 and with helping to monitor growth, distribute supplementary food and vitamin A, maintain immunization records, and, sometimes, to educate mothers. In these activities, the Anganwadi Worker is assisted by a helper and is supported by a Child Development Project worker.

***The Dalmau Project.*** S. Chaturvedi and colleagues (1987) have carried out an evaluation of the impact of the ICDS scheme on the psychological and social development of children in one of the original 33 areas, Dalmau, located in Uttar Pradesh. Children in the Dalmau community development block (N = 214) were compared with children in an adjoining block, Lalganj, which was not covered by the scheme (N = 205) and which "is almost similar to Dalmau block in socio-cultural, geographical, anthropological factors, etc., and the welfare services available to the community, except the ICDS scheme." (154) Three villages from each block were selected by simple random sampling. The study population consisted of all children aged 6 to 8 residing in the selected villages. These children had been exposed to ICDS for a continuous six-year period. The 214 and 205 children from the respective blocks represented 97 percent of all the 6-to 8-year olds in each block. Children in ICDS and non-ICDS blocks ". . . were well matched according to the parental education, parental occupation, number of educated members in the household, socio-economic status, period of parental company and some other bio-social characteristics which have an association with child's mental and social development." (158)

Children were tested using the Raven Colored Progressive Matrices Test and the Seguin Form Board Test. Their attendance at school was taken from the school register and academic performance was rated by averaging marks on the two previous main school examinations taken (or by the school entrance examination score if the child had just entered school). A behavior score was obtained from teachers using a specially constructed rating scale (maximum 20).

Results show that children in ICDS areas were significantly better than non-ICDS children in school attendance, academic performance, and general behavior in school. There was also a statistically significant difference in the intellectual status of the two groups which, however, held only for ages 6 and 7. A finding not immediately evident is that a significantly higher percentage of ICDS vs. non-ICDS children went to school (89 vs 78 percent), and entered school at an earlier age (85 vs 69 percent had entered by age 6). The researchers report also that the differences in school going occur only among girls. In both groups and in all ages, the percentage of school-going children was higher among males than females. Male children also entered the school at an earlier age. Gender differences were more pronounced in the non-ICDS group.

***Lal and Wati*** (1986) evaluated the effect of the ICDS programme on enrollment, drop out, and performance of primary school children from 14 rural villages in the state of Haryana. The 1271 children studied were enrolled in ICDS in the period between 1977 and 1981. They were compared with 436 children from the same district who had not been enrolled. We are not told how the children were selected for study and for comparison. There is a major bias in the sample;

two-thirds of the 1271 children and 77 percent of the 436 children were classified as higher caste. Enrollment was operationalized in terms of whether children were in the right grade for their age. School performance was assessed by interviewing 28 teachers who were asked to categorize students into 3 groups using a 15-point scale. Teachers did not have knowledge of which children had attended ICDS.

A comparison of enrollment (right age for grade) and drop out of the ICDS and non-ICDS children is presented in Table 1, within three main categories of caste. The ICDS children are more likely to be enrolled and less likely to drop out, within all three of the caste groups. Major differences in drop out are found within the "scheduled" and "backward" castes; however, the numbers in these two groups are relatively small. Because the 436 children with whom the comparison was made came from the same ICDS block as the ICDS children, a "contamination effect" could be at work to mute differences associated with the programme.

TABLE 1

ENROLLMENT AND DROP, ICDS AND NON-ICDS CHILDREN, BY CASTE\*

	<i>Scheduled Castes</i>		<i>Backward Castes</i>		<i>Higher Castes</i>		<i>All Castes</i>	
	ICDS	Non-ICDS	ICDS	Non-ICDS	ICDS	Non-ICDS	ICDS	Non-ICDS
Enrollment (%)	80	56	75	56	82	59	81	58
Drop Out (%)	19.2	34.7	5.0	25.0	6.5	8.4	7.3	12.8
N=	12	22	305	78	839	336	1271	436

\*Source: Sunder Lal and Raj Wati, Non-formal Preschool Education-An Effort to Enhance School Enrollment, A paper prepared for the National Conference on Research on ICDS, February 25-27, 1986, New Delhi, National Institute for Public Cooperation on Child Development.

If, as seems to be the case in this study, the ICDS program can result in a 5 percent reduction in the drop out rate and improve efficiency by increasing the percentage of children in the right grade-for-age by 20 percent, the program could affect considerable savings for the educational system.

On the basis of teacher's performance ratings, the authors conclude:

Overwhelmingly, the majority of the children in top ten and middle twenty were those who had 2-3 years of exposure of early childhood at angawadi centres. The children who had the exposure in angawadis picked up faster in the first two years of schooling. Their attention span and retention power was much superior to their unexposed peer groups. There were observable differences in memory power, vocabulary, writing power, and also legibility. Housekeeping qualities in these children were also par-above. General discipline, attendance,

cleanliness, behaviour with teachers and classmates and ability to express positively was better in the exposed group.

#### ■ COLOMBIA: PROJECT PROMESA

Nimnicht (1986) reports on the intellectual development of children in a project carried out in four small, rural, isolated, and extremely poor communities on the Pacific Coast of Colombia. The PROMESA project, designed to develop a better environment for the healthy development of young children, evolved over the years since its beginning in 1978 to include:

- a programme for mothers of preschool children designed to foster the intellectual development of children 3 to 7 years old during their daily interactions with the children and through the use of games.
- a series of projects to improve the physical environment by building latrines, disposing of garbage, draining stagnant water, controlling animals and finding sources of good water.
- a community-administered PHC programme to overcome lack of a doctor.
- training of "promoters" as a way of developing local leaders.
- adult education and vocational training to improve income-generating skills as well as formation of production and marketing groups.
- an early stimulation programme for mothers of 0 to 3-year olds.
- a nutrition programme, providing food to preschoolers and nutrition education to mothers.

A "cohort design" was used to evaluate the effect on school achievement of this multi-faceted programme.

. . .the children came from the same population and were only different in their ages. Thus, if the program were effective in giving the younger children more opportunities to learn, then each year, the children in the first grade should test somewhat better than those children who were in the first grade the previous year. This should be true throughout the elementary school as the project progressed . . . ( 7)

Three related achievement tests were developed: one for the first grade, one for the second and third grades, and one for the fourth and fifth grades, each with subtests on mathematics, language and problem solving. These tests were administered each year from 1980 through 1985. Children in a public school of blue-collar neighborhood (Sabaneta) of the Colombian city, Medellin, were also tested, to provide comparative baseline data.

In general, the hypothesized improvement in academic achievement occurred over time. "The mathematics, language and problem solving scores for the first grade [went] from significantly below the Sabaneta group to being on a par with that group. . . . the same pattern holds for all five years." (8) A graph illustrating the changes in mean scores at the first grade level is presented in Figure 2 (figure 2 not available). The shaded area represents one standard deviation on either

side of the urban children's mean score in the first grade. The white area represents one standard deviation on either side of the mean test score for rural project children. In 1980, the two means are five points apart; in 1985, rural children had caught up to the 1980 urban norm. We do not know from the study whether the mean for urban children changed from 1980 to 1985.

Persistence in school was studied using information from a sample of mothers from the four project communities who were interviewed in 1980 and in 1986. (The evaluation does not report how the sample was chosen.) In the interviews the name, age, and grade level attained in school for each child in the family was obtained. From this listing, twelve-year olds were selected out for study because they were old enough to have completed the elementary school and young enough in 1986 to have been involved in PROMESA. The comparisons, presented in Table 2 show that school enrollment and persistence is significantly higher for PROMESA participants than for others, a strong finding given the high probability of contamination effects for the non-PROMESA children. We do not know, however, how PROMESA children may differ from non-PROMESA children.

TABLE 2  
SCHOOL ENROLLMENT

	1980	1986 PROMESA-NO	1986 PROMESA-YES
	N= 67	N= 30	N= 48
More than 5 years	5%	13%	16%
Reach the 5 <sup>th</sup> grade	12%	23%	35%
Reach the 4 <sup>th</sup> grade	31%	30%	60%
Reach the 3 <sup>rd</sup> grade	55%	47%	73%
Reach the 2 <sup>nd</sup> grade	76%	77%	83%
Entered the 1 <sup>st</sup> grade	90%	87%	100%

Using the Non-parametric Kolmogorov-Smirnov two sample tests, we made the following comparisons:

1980 y No PROMESA 1986  $X^2 = 1.08$  2df.  $P = .70$

1980 y PROMESA 1986  $X^2 = 9.17$  2df.  $P = .01$

1986 PROMESA y No PROMESA  $X^2 = 6.65$  2df.  $P = .05$

Taken From: Nimnicht and Posada, p.9

■ BRAZIL: PROGRAMA DE ALIMENTACAO DE PREESCOLAR (PROAPE)

In the 1985 paper, information was provided (Halpern and Myers (1985), Note 3, p. 21) about a combined nutrition and non-formal preschool programme, called PROAPE, and carried out with loan funds from the World Bank. In PROAPE, children ages 4 to 6 are brought together in centres during weekday mornings in groups of about 100 children for supervised psycho-motor activities and a snack. A health component is also included in the programme. The children are attended by trained personnel assisted by mothers or other family members on a rotating basis. The programme was implemented, with some variations, in several locations. An evaluation showed that 59.5 percent of the project children pass first and second grade compared to 13.5 percent among non-participants.

Several other pieces of information can now be added to that finding. The first is taken from a review of World Bank nutrition projects (Berg and Brems 1986). "The academic performance of children with two years' exposure to PROAPE was consistently better than that of the nonparticipating group, ranging from 2 to 21 percent in three variants of the model." (20) An evaluation of one variant produced the following figures for performance, drop out and costs:

Of the children who had been in PROAPE, 93 percent in a sample group completed the first year of school and 68 percent of that group passed to the second; in the second grade 94 percent of the remaining children completed the year and 79 percent of these passed. Non-PROAPE children did less well. The total cost of schooling (including preschool PROAPE services per second-grade graduate was about \$US50 (or 11 percent) less for students who had been in the PROAPE program than for those who had not been in PROAPE. (57)

TABLE 3  
COST-EFFECTIVENESS OF PROAPE PRESCHOOL FEEDING  
AND STIMULATION PROGRAM IN BRAZIL

<i>Measure</i>	<i>PROAPE</i>	<i>Non-PROAPE</i>
Number of first-grade entrants	22,298	22,298
Dropout Rate (percent)		
First grade	7	9
Second grade	6	6
Repeater Rate (percent)a.		
First grade	32	43
Second grade	21	38
Graduation rate (percent)b.		
First grade	63	52
Second grade	74	58

Number of Graduates		
First grade	14,048	11,595
Second grade	10,396	6,725
Cost (dollars)		
Project cost	1,036,370	*
First grade education c.	2,185,200	2,185,200
Second grade education d.	1,376,700	1,136,310
Total	4,596,270	3,321,510
Cost per second grade graduate	442	494

\*Not applicable.

a. Percentage of non-dropouts failing to pass to the next grade.

b. Percentage of total entrants to the grade passing to the next grade.

c. Estimate based on the annual cost per primary student in Nicaragua (\$98), on which data were available, time the number of first-grade entrants in the sample(22,298). First-grade repeaters were excluded. The estimate assumes that the cost and efficiency of the educational system in Nicaragua and Northeast Brazil were compatible at the time of the program.

d. Estimate based on the assumed annual cost per primary student (\$98) times the number of first-grade graduates.

Source: Vital Didonet, "Atendimento integrado de educacao saude nutricao e envolviment comunitario do pre-escolar, atraves de metodologia de baixo custo e ampla cobertura: sintese da exposicao," paper presented at the World Assembly of Preschool Education, Quebec, August 28-September 2,1980; education cost derived from data of the Nicaragua Academy forEducational Development, 1975.

As presented in Berg, p.58

A second piece of information comes from reviewing an analysis of the PROAPE project, carried out in Alagoas in the Northeast of Brazil. The model as implemented in Alagoas included education, health, and nutrition components. Children, ages 4 to 6, were brought to centers operated in spaces donated by the community. For every 100 children there are three *estagiarias* (trained para-professionals ) who are paid 70 percent of a minimum salary for a 3-hour workday. The *estagiarias* were assisted by family members. Supplementary feeding consisted of a glass of milk, and bread with jelly or margarine. The project provided training, educational materials, supplementary food, dental treatment, vaccinations, vitamin supplementation, and visual exams.

The Alagoas evaluation is of particular interest because it includes comparative dropout and repetition information for children from first grade who attended (1) formal kindergartens, (2) an alternative form of pre-school called a Casulo, or (3) PROAPE, and similar information for (4) children who did not participate in any preschool experience. As shown in Table 4, 73 percent of the children from PROAPE and 76 percent of the Casulo children passed the first grade in 1982, as compared with only 63 percent of the formal kindergarten children, and 53 percent of those without a preschool experience. Only 9 percent of the PROAPE children actually failed (vs. 16 percent for the Casulo, 28 percent for kindergarten, and 33 percent for nonpreschool children).



This is so despite the fact that the PROAPE children attended for only 78 days as compared with a 180-day period for Casulo children and a 2-year programme for kindergarten children.

TABLE 4  
ACADEMIC PERFORMANCE OF CHILDREN IN THE FIRST YEAR OF 1ST GRADE-1982A.

	<i>PROAPE b.</i>		<i>Casulo b.</i>		<i>Jardim b. Infantil</i>		<i>Children without Pre-School Education</i>	
	No.	%	No.	%	No.	%	No.	%
Registered Children	184	100	557	100	320	100	2,334	100
Children remaining until the years end	150	82	517	92	291	91	2,000	86
Drop-outs	34	18	40	8	29	9	.334	14
Passed	134	73	426	76	201	63	1.247	53
Failed	16	9	91	16	90	28	.775	33

Data from the supervisors of schools with children from pre-school projects in 1982.

Prior to their primary school, early intervention programmes attended children for different lengths of time: PROAPE, 78 days; Casulo, 180 days; Jardim Infantil, 540 days.

Taken from: Ministerio da Saude y Instituto Nacional de Alimentacao e Nutricao, 1983.

The Alagoas evaluation also presented cost figures for the various programmes and for the first year of primary school. These are combined in Table 5 with the adjusted costs for the first year of primary school (using the differential pass rates applied to the overall per student figure) to calculate the relative cost of producing a first year graduate for each of the groups. If the figures are correct, the combined preschool and primary school cost per first grade graduate for PROAPE children (including the PROAPE costs) is 17 percent lower than for a child with no preschool experience and 32 and 39 percent lower than the combined preschool and primary school costs for the Casulo and kindergarten children, respectively. In these terms, the PROAPE program not only paid for itself but resulted in a primary school cost saving in the first year of 17 percent over and above the cost of PROAPE.

TABLE 5  
RELATIVE COSTS OF PRODUCING A FIRST GRADE GRADUATE\*  
\$US PER CHILD:

	<i>Pre-School Cost</i>	<i>First Grade Cost</i>	<i>Combined Cost</i>
PROAPE (78 days)	\$US 38	\$US 281	\$US 319
Casulo (180 days)	204	267	471
Kindergarten (540 days)	200	326	526
No preschool	0	383	38

\* This table was derived from information in: Ministerio da Saude y Instituto Nacional de Alimentacao e Nutricao, "Analicao de PROAPE/Alagoas com enfoque na area economica," Brasilia, MS/INAN, 1983. Mimeo.

Note: The relative per child costs for the first grade were calculated by adjusting the overall cost to reflect the differential pass rates, as presented in Table 5.

Before accepting these data at face value there are several questions one would like to see answered. Do the children in the various groups come from similar social and economic backgrounds? (In a personal communication assurance was given that the children all came from the same catchment area and were therefore very close in their backgrounds.) Is dropout related to differential background of children and to a differential probability that the children would have passed had they remained? What percentage of the dropout is really due to moving to another location where re-enrollment occurred? How long did children actually attend the various preschool programmes? (It may be that children classified as kindergarten children actually attended for a year or less rather than two years so that the cost per student would be lower than calculated.) These questions notwithstanding, the evaluation strongly suggests that non-formal early childhood programmes can have an impact on progress in primary school and can result in cost savings for the education system.

#### ■ NIGERIA: FOUR STUDIES

Table 7 (not available) provides information about four studies carried out in Nigeria, each examining the relationship between preschool attendance and subsequent educational performance in primary school. All four studies found that students attending preschools performed better than non-preschool students in the first year of primary school. Two studies carried their analysis to differences in the third year of primary school.

Results from these four studies were mixed, depending on whether the outcome variable was an IQ test, a researcher-prepared test, or an official test for year-end promotion. There seemed to be a lasting effect of the early interventions on tested mental ability (Olatuni 1986). A significant difference on research-constructed achievement tests was found by two researchers. ( Imoagene and Roberts), but not by the third (Olatuni). One found a significant difference on official tests in favour of those with preschool experiences (Roberts), another did not (Imoagene). In general, researchers suggested that preschool effects weakened over time.

Three of the four researchers found strong relationships between social background, measured in several ways, and primary school performance; one did not (Imoagene) because the group studied was so homogeneous. Preschool experience did seem to improve "school readiness" significantly (as indicated by 1) the differences found by Onibokun using an adapted, translated, and back-translated version of the McCarthy Scales of Children's Abilities and 2) the differences found by Olatuni using Raven's matrices). However, preschool could not seem to compensate for deficiencies in primary school environments, particularly in the poorer quality schools.

The results of these four studies are suggestive, but do not help very much to advance the understanding of relationships between provision of preschooling and later performance and progress in primary school. Unfortunately, the small samples and the relatively high correspondence between having gone to a nursery school and middle/upper social status made it impossible to untangle the two variables. This was also true for attendance at public and private schools. This inability to untangle variables is a weakness of many studies that try to relate preschooling to primary school performance.

Another weakness of all four studies was their cross-sectional rather than longitudinal nature. Nor did the studies take into account repetition and drop out, although Olatuni notes, "If preschool education can help pupils to profit maximally from the first year—and the findings of the study suggest that it can—then it could be instrumental in curbing the drop out and failure rates which are highest in Primary I, and in helping pupils to remain bouyant at what appears to be one of the most difficult stages of their schooling." (1986, 104)

## *Summary and Discussion*

The evidence reviewed in this paper provides additional support for three conclusions drawn by Halpern and Myers in 1985:

1. Early intervention programmes can have a positive effect on the probability of enrollment, on initial adjustment (as represented by repetition and drop out rates), and on achievement in the early years of primary school.
2. The mechanisms producing improved enrollment, progress, and performance in primary school appear to reflect some combination of earlier age of enrollment, improved school readiness (as indicated by tests of mental and social development), and improved health and energy levels.

3. Poorer children and children from social groups that have been discriminated against may benefit more than more privileged peers from early intervention programmes that are multi-faceted.

The update also provides examples hinting that:

4. There may be gender differences in programme effects, helping girls catch up to boys in circumstances where their primary school entrance and progress lags.

5. Parental education and changes in parental expectations can play an important role in aiding improvement in primary school. Supporting parental confidence and self-esteem may be at least as important in the process of working with parents as the provision of specific information about parenting.

6. Early interventions can effect cost savings in primary school.

The update provides some evidence that effects might persist rather than be rapidly overwhelmed due to poor primary school quality as was found in the previous review. However, only one study looked at school progress and performance beyond the third grade, and that was a cohort study that did not follow individuals. Thus, the durability of effects and the conditions under which they persist or deteriorate, remains to be documented.

The evidence uncovered is encouraging. It provides the kind of hopeful conclusions that should stimulate additional experimentation and evaluation. At the same time, the available information is still not sufficiently broad or detailed to draw conclusions about the kinds of early childhood interventions most likely to benefit children in the difficult and varied circumstances found in most developing countries. The different questions addressed, evaluation methods used, and combinations of programme inputs examined make it impossible to add up, or even to compare, outcomes.

There continue to be a number of methodological questions that evaluations of early childhood programmes need to address. One of the most difficult of these is the question of a comparison group. As long as evaluations continue to be after the fact, cross-sectional, without an appropriate comparison group, and inattentive to such basic intervening variables as the differential backgrounds, economic circumstances, and attitudes of parents, we will have to continue heavily qualifying interpretations of results.

Several inventive ways were devised in the studies reported above for choosing groups of children with whom programme children could be compared. However, the choice of comparative groups remains a weak feature of most studies, and reported results too often (as in the Nigerian case) fail to untangle possible differences between programme children and comparison groups.

In addition, studies do not adjust for "dosage," i.e., for differences in the amount of exposure to the particular treatment(s) being studied. It is seldom appropriate to lump together children who have been participating in a programme for two years with those who have spent only six months in a programme. It is incorrect to analyze together effects for those who are present every day and those who attend only occasionally.

We continue to lack evidence derived from longitudinal studies that trace particular children over time.

In addition, we could profit from evaluations that take an anthropological view and that follow the process of moving from home to preschool, looking, for instance, at what a child may lose by attending a preschool (rather than being at home) as well as at what is gained in terms of preparation for school.

From the current research and evaluations, we have little idea how much of the improvements that seem to be associated with preschool interventions might be replaced, or increased, or sustained as a result of simultaneous reforms within primary schools. There is certainly room for experimenting with changes within the primary school system, in combination with preschool interventions.

Much more work is needed to sort out the effects of "empowering" parents, much as was done in the Turkish study reported on above.

### *Looking Ahead*

Children who will graduate from primary school in the year 2000 have already been born. Looking ahead to their progress and performance through primary school systems and beyond means acting today to assist them in their development. The present knowledge base is sufficient to begin constructive work on that task, learning as we go. Sounder studies of programme effects would enormously help that process, not only by helping adjust efforts along the way, but by providing a more systematic and convincing information base for policy makers and planners to call upon when they want to begin or need to defend such efforts.

Returning to a previous conclusion, it is possible to imagine an integrated early childhood-early primary programme that has as a central objective hooking children into the formal educational process [and regularizing their passage through it]. Such a basic reorientation would require a research and development programme ... beginning with an examination of what happens to children currently during the transitional years (4 to 8); what teachers do, why they do it, and the effects of their behaviour on children.

An integrated early childhood-primary programme could serve as a vehicle for linking family and community interests and strengths to the formal schooling system; for example, infusing the values and content of the local culture into the curriculum, at first at the pre-primary level, then at the primary level; serving as a focus for community development energies that, once organized, could also be focussed on other issues; involving teachers in the solution of community problems linked to child development but not obviously part of the formal school system's mandate; reaching parents and their children with educational services before the perceived costs of children's participation in a process with ill-defined returns becomes too high.

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