



## First grade school readiness of former child participants in a South Carolina replication of the Parent–Child Home Program

Phyllis Levenstein<sup>a,\*</sup>, Susan Levenstein<sup>b</sup>, Dianne Oliver<sup>c</sup>

<sup>a</sup>*State University of New York at Stony Brook, USA*

<sup>b</sup>*Gastroenterology Department, Spallanzani Hospital, Rome, Italy*

<sup>c</sup>*Adult Early Childhood and Family Education, Florence County School District 3, Lake City, SC, USA*

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### Abstract

The Parent–Child Home Program (PCHP) is a 2-year home-based program for low-income parents and their 2- and 3-year-old children at risk for educational disadvantage. To study the effects of a South Carolina PCHP replication on the school readiness of 84 former participants in four successive first grade cohorts (1997, 1998, 1999, and 2000), their scores on the Cognitive Skills Assessment Battery (CSAB) given to all South Carolina first graders were compared to scores statewide and in the school district. Scores indicating school readiness were achieved by 82.4% of first graders statewide and by 84.5% of all PCHP children (by 92.2% when seven PCHP children with severe developmental delay [SDD] were excluded). Among those receiving free lunch, 74.4% of statewide children but 93.2% of non-SDD PCHP children passed the CSAB school readiness score of 88 ( $p < .001$ ). 75.6% of African American children passed the CSAB statewide, but 92.7% of non-SDD African American PCHP children did so ( $p < .01$ ). Pass rates of non-SDD PCHP children were higher than those of at-risk non-PCHP children in the school district ( $.05 < p < .1$ ). All parents invited into the PCHP accepted enrollment and 96.2% of those who remained in the district completed the 2-year program, at a cost of US\$2000 per family. The PCHP is a feasible social program that normalized performance on a standardized educational test in at-risk first graders and eliminated the excess risk of inadequate school readiness associated with low income and African American ethnicity. © 2002 Elsevier Science Inc. All rights reserved.

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\* Corresponding author. 4500 Gilbert Street, Apt. 602/603, Oakland, CA 94611, USA. Tel.: +1-510-653-1127.  
*E-mail address:* phyllislevenstein@compuserve.com (P. Levenstein).

## **1. Introduction**

### *1.1. General introduction*

In the early 1960s, the federal government hypothesized that poverty is a predictor of children's educational disadvantage, as part of President Lyndon Johnson's War on Poverty. Proposed remedies to offset the anticipated school problems crystallized into the first enactment of the federal Elementary and Secondary Education Act (ESEA) in 1965. The relationship of poverty to educational disadvantage has since been confirmed by many empirical studies that have continued into the present (e.g., Brooks-Gunn & Duncan, 1997; Duncan & Brooks-Gunn, 2000; West, Denton, & Gerino-Hauskin, 2000).

The need to remedy children's educational problems has become in the last decade an urgent social and political issue, generalized both nationally and in most states to all children, not only those at risk for educational disadvantage (e.g., Hidi & Harackiewicz, 2000; Sameroff, 1978). The focus has been on the decrepit condition of many school buildings and especially on the supposed inadequacies of teachers. There are occasional local attempts to aid teachers by decreasing class size and by searching, especially in large cities, for more, even minimally qualified, teachers to service the ever-increasing numbers of students, many the children of new immigrants. Some Congressional attention has also been given to the prevention of educational disadvantage, before children reach elementary school, by a move to expand to more preschool children the availability of Head Start, the locally sponsored but federally funded national network of center-based preschool programs, created in 1965 as part of the War on Poverty. More concretely, a July 2001 White House conference ("White House Summit on Early Childhood Cognitive Development") announced the cooperation of the US Department of Education and the US Department of Health and Human Services in expanding research on early childhood cognitive development through a new 5-year, US\$50 million effort, through Head Start and other federally funded preschool programs (Chamberlin, 2001).

Although center-based preschool programs, some with a strong research bent (Berrueta-Clement, Schweinhart, Barnett, Epstein, & Weikart, 1984; Campbell, Pungello, Miller-Johnson, Burchinal, & Ramey, 2001; Ramey & Smith, 1977; Reynolds, Temple, Robertson, & Mann, 2001; St. Pierre, Layzer, Goodson, & Bernstein, 1997) have been dominant approaches to preventing poverty-linked school problems, several preventive programs for at-risk preschool children have been conducted in children's homes, including Early Head Start, the relatively recent downward extension of Head Start. All "home visit" programs involve parents, in the hope that child graduates of such programs will arrive at elementary school enriched by parent supported cognitive development that will eliminate the children's educational disadvantage.

The earliest of the home visit programs was the 2-year (actually 2 school years) Mother–Child Home Program, created in 1965 and recently renamed the Parent–Child Home Program (PCHP), to reflect the growing participation of fathers. The PCHP was designed to enrich, by a unique play-oriented, nondidactic approach, the parenting skills of parents challenged by low income and limited education, especially their verbal interaction with their young children, and to foster attachment between parent and child (Levenstein, 1988).

The PCHP has only two proximate goals: (1) to increase the cognitive and emotional development, and thus the school readiness and perhaps eventual literacy, of at-risk toddlers and (2) to promote parents' verbal interaction with their children and other parenting skills, embedded in the attachment between parent and child. It does not aim to solve all of the economic and other family problems related to poverty, but instead concentrates on improving children's chances to escape such problems through the upward mobility made possible by later school success.

The PCHP has been implemented in numerous locations since it was first developed. Because one such replication began in Massachusetts in 1970, it has been possible to conduct a follow-up study of its effects on several cohorts of its child participants' high school graduation. The study found that the former PCHP children, all at risk for educational disadvantage, graduated from high school at the same rate as middle income students (Levenstein, Levenstein, Shiminski, & Stolzberg, 1998) and at a significantly higher rate than randomized controls.

The present investigation explored, in a semirural school district in South Carolina, the effect of another replication of the PCHP on the school readiness of especially at-risk former PCHP child participants near the beginning of their school years, that is, soon after entering first grade. Passing a school readiness standard could predict the probability of their later literacy and academic achievement. This study was facilitated by the fact that the State of South Carolina has mandated the administration to all first graders, throughout the state, of a standardized test of school readiness early in first grade. The assumption was that a passing score on that test is an intermediate step toward later school achievement. The test is thus available as an instrument for evaluating the success of early childhood interventions in reaching that intermediate status.

The present study was therefore designed to assess, by their school readiness test scores in first grade, the readiness for academic learning of former PCHP participants, compared to those of non-PCHP-participants. These test results might provide evidence for the PCHP's efficacy in preparing at-risk children to be ready for school achievement in and beyond first grade.

The questions to be answered by this study were:

1. Did this South Carolina PCHP replication succeed in preparing at-risk toddlers for later school readiness and thus eventual literacy?
2. What was the efficacy of the PCHP among specific disadvantaged subgroups?
3. What were the determinants of outcomes for former PCHP youngsters?
4. What appear to be the PCHP features that promote school readiness?

### *1.2. Home visitors in the PCHP*

The program's unusual method has been described in detail elsewhere (Levenstein, 1988; Levenstein et al., 1998), but the central role of PCHP's Home Visitors merits further clarification. Their involvement of parents and their toddlers in completely non didactic, noncounseling activities is not common in other home-based programs; in the latter, home

visitors are often expected to become friends of the parents and to give them counsel (cf. Klass, 1996). In the PCHP, the Home Visitors, trained in eight initial sessions (e.g., in the use of curriculum “Guide Sheets”) and then supervised weekly, refer advice-seeking parents to their Coordinators (PCHP directors). Their educational achievement need be no more than high school graduation. The job of the Home Visitors is to convey, in friendly twice-weekly home play sessions with parents and their 2-year-olds (3-year-olds in Year 2), a curriculum of conceptual verbal interaction and other positive parenting techniques by showing—demonstrating—how parents can combine conversation with play around a weekly program gift of a colorful book or toy of high quality. The Home Visitors encourage by example parents’ verbal interaction around play with the toys, and around book illustrations and content, with the child sitting close by. The Home Visitor fades into the background of each session as soon as the parent begins to take over.

By thus subtly but significantly effecting changes in parents’ behavior (Levenstein & O’Hara, 1993) and through the continuing presence of the gifts in the home, the Home Visitor and the PCHP aim to ensure that parents’ emotionally and cognitively enhancing verbal interaction with the children will continue long after the program is over.

### *1.3. Theoretical foundation of the PCHP*

The apparently simple method of the PCHP rests on a complex theoretical and empirical interdisciplinary foundation involving concepts related to cognitive, attachment, and social issues. It is built around Cassirer’s philosophic position that, among animals, humankind alone is uniquely capable of conceptual/symbolic thought: the “animal symbolicum” (Cassirer, 1944).

Several theoretical concepts underlie the program’s cognitive aims: that language is a perfect symbol system evolved from the first utterances of early man (Sapir, 1921) that learning occurring early in life is the most enduring (Hebb, 1961); that conceptual growth and abstract ideation depend on the intertwined development of thought and language (Vygotsky, 1962), and that children’s representation of the world around them develops in three stages, from the enactive (through body language) through the “ikonic” (through images and the words for them), to arrive finally at the abstract realm of symbolic language (Bruner, Olver, & Greenfield, 1966; Sapir, 1921, 1962) where the “small change” of ikonic words is transmuted into the larger denominations of more abstract concepts symbolized by language (Bruner, 1964). These empirically backed theories of conceptual and thus cognitive development, rooted in the development and use of language, were joined by concepts from Sigel’s original distancing program, an inquiry-based instructional approach to enhance the development of representational understanding, i.e., the awareness of the equivalence of different symbol systems (Sigel, 1964; Sigel, Stinson, & Flaughner, 1991). Sigel’s (1964) comprehensive essay on the attainment of concepts, and especially his “distancing hypothesis,” supported by studies of young children’s intellectual growth from dependence on the immediate proximity of objects to emancipation from them through pictures and, eventually, symbolic language (Sigel, 1971), the heart of the PCHP’s method. These concepts have been underlined by the recent observation, “The pre-

preschool child learns as a result of continuous feedback from the mother” (Hidi & Harackiewicz, 2000).

Hunt’s (1961) *Intelligence and Experience* was an important influence in the PCHP’s emphasis on verbal–conceptual parent–child exchanges in their relationship to cognitive development. The crucial impact of families on children’s language and cognitive development was incorporated also from a study of effective parenting by Baumrind (1967) and from Deutsch’s (1965) finding of a link between family language and children’s school performance (Deutsch, 1965). Bernstein (1961) noted the differences, in England, between the ways working class and middle class parents spoke with their children; the “telegraphic” style of the first contrasted to the more elaborated speech of the richer, more educated parents. Socioeconomic status (SES) has similarly been found to be a strong influence on the language used in American families, most recently in the intensive longitudinal research of Hart and Risley (1992, 1995, 1999). They demonstrated that SES influenced the degree of children’s early exposure to parent–child verbal interaction, and that it significantly forecast later cognitive development and school success, to the detriment of children from low SES, low verbal interaction families. The many studies regarding the complex deleterious effects of poverty on children, proliferating as long ago as Chilman’s (1966) mid-sixties review, have recently been brought up to date in the work of Brooks-Gunn and her associates, especially in stressing the poverty-lowered “opportunities for learning in the family” (Duncan & Brooks-Gunn, 2000).

The frequently cited gap in test and academic achievement between European–American and African American students (e.g., Jencks & Phillips, 1998; Phillips & Jencks, 1998) and between high and low SES children (Hart & Risley, 1992, 1999) is explained not simply by ethnicity but by a much broader array of family factors mainly associated with both poverty related and family-transmitted child rearing customs whose hampering influence may reach down through several generations (Phillips, Brooks-Gunn, Duncan, Klebanov, & Crane, 1998). These effects have only been amplified by the advent of the Computer-Internet Age within the last dozen years. Becker (2000) noted that only 22% of children from families with low annual incomes had a home computer; even fewer children owned computer printers; and, among African American and Hispanic–American children, almost none had access to the Internet with its wealth of information. Becker commented that, “When the disparities in computer access are compounded by [lack of] access to the Internet, the differences between some ethnic and SES groups are monumental.”

The PCHP’s encouragement of attachment between parent and child by their sharing the pleasures of playing and reading together was supported by Bronfenbrenner’s review of the positive effects on development of young animals’ physical closeness to their mothers (Bronfenbrenner, 1968). His 1974 review (Bronfenbrenner, 1974) related to the seminal work of Ainsworth (1963), Ainsworth, Behar, & Waters (1978), and Bowlby (1947, 1951), who long ago surmised a connection between early affective lacks in the lives of children and their later social problems (1947 and 1952). Almost half a century later Bowlby’s guesses were supported by the work of Sroufe (1996), Chen and Siegler (2000), Kochanska (2001), McLaren (1988), and by the longitudinal study of Carlson

(1998), which showed a significant association between early “disorganized” attachment behavior and children’s later behavior problems and psychopathology, as identified by teachers as late as high school when the children were 17-1/2 years old, problems that often impede children’s academic achievement.

#### *1.4. Previous studies of PCHP’s effects*

Empirical evidence has consistently supported the predicted effects of the PCHP on at-risk children and their parents, except for a Bermuda study (Scarr & McCartney, 1988) in which two-thirds of the participants were of middle-income backgrounds. Randomized PCHP and control children had, at age 2, similar IQs, 99.8 and 99.3, both higher than expected for at risk toddlers (Levenstein, 1989). They had, at age 4, post-PCHP IQs showing a numerical but nonsignificant superiority for the PCHP group, 106.6 as compared to 103.1 for Controls.

Beginning with the first pilot study (Levenstein & Sunley, 1968), researchers at the PCHP model program (the original Mother–Child Home Program) showed that yearly cohorts of socioeconomically at-risk children had significant short-term cognitive gains, bringing them into a cognitive range that predicted school success. Similar results were found in the first four PCHP replication sites (Levenstein, 1975). In the original model program (Consortium, 1983; Levenstein, O’Hara & Madden, 1983; Madden, Levenstein, & Levenstein, 1976; Royce, Darlington, & Murray, 1983) and in replications (Bradshaw-McNulty & Delaney, 1979; DeVito, & Karon, 1984, 1990; Lazar & Darlington, 1982; Levenstein et al., 1998; Springs, 1990), PCHP children maintained significant academic superiority up to and including high school graduation over similarly disadvantaged control and comparison children with similarly low pre-program cognitive test scores.

The PCHP has also been shown to have significant positive effects on participating parents’ verbal interaction behaviors, as measured in a follow-up study that examined videotaped play sessions between program and control children and their mothers 2 years after completion of the program (Levenstein & O’Hara, 1983, 1993). In this study, program mothers’ verbal interaction with their children showed a lasting superiority over that of nonprogram mothers, which correlated in turn with their children’s first grade cognitive skills and emotional stability. These conclusions complemented a previous follow-up study which had demonstrated a significant correlation between mothers’ verbal responsiveness near the program’s termination (as measured by a program created instrument “Parent and Child Together”) and children’s first grade skills (Levenstein, 1979).

Recent studies of other family based interventions have seemed to support the parent–child reading aspect of the PCHP method. Bus and van IJzendoorn (1988) hypothesized connections among mother–child interactions, attachment, and what they named “emergent literacy,” finding that parents’ reading to their preschoolers and discussing the reading (as in the PCHP) were precursors to school success. Whitehurst et al. (1994) found emergent literacy effects of “dialogic reading” of mothers with preschoolers first by the end of 1 preschool year (1994) and later in a follow-up study through second grade (Whitehurst et al., 1999).

## **2. Subjects and method**

The longitudinal study presented here focuses on the first grade school readiness, as shown by passing scores on a standardized test, of four yearly cohorts of former at-risk child participants in a South Carolina replication of the PCHP, as compared to the scores on the same test of non-PCHP first graders, both at-risk (“free-lunch” status or African American ethnicity) and not at-risk.

Among 20 PCHP replications in South Carolina, only the one under scrutiny, in Florence County School District 3, had been conducted long enough for some of its child participants to reach first grade. The basic criteria for program entry had been, as in the original and in all PCHP replications, the 2-year-old toddlers’ parents’ limited education and low income (as indicated by older siblings’ or the toddler’s future free lunch eligibility) that puts their toddlers at risk for environmentally caused delays in the development of cognitive skills and subsequent school readiness (Levenstein, 1988). Because of the district’s limited resources, not all low-income (potentially free lunch eligible) 2-year-olds could be offered the PCHP. Instead, a limited number of exceptionally high risk toddlers were referred to the PCHP by welfare social workers or by teachers of older siblings, either because those siblings had demonstrated school learning problems, and/or because the parents had failed to attend planned school conferences with teachers of older siblings, and/or because home furnishings and children’s appearance had evidenced physically visible deprivation (e.g., inadequate, very shabby furniture, ragged clothing, and overt hunger). Almost all (89 of 92) referred families were free lunch eligible in addition to their other risk characteristics; two of the three who, on the contrary, had a higher family income had been referred by the teachers of older siblings, while the third was essentially self-referred by a mother who perceived her child to have learning disabilities (this single self-selected child failed to attain a “passing” score on the CSAB in first grade). All 92 parents who had been thus selected for one or more of their exceptional needs had accepted the invitation and had enrolled in the district’s PCHP in school years beginning in 1993, 1994, 1995, and 1996.

Thus of the 92 parents who were offered the PCHP in those 4 years, 100% accepted enrollment. Eighty-seven of the 91 PCHP enrolled parents for whom information is available (96.7%) completed at least 1 program year and 75 (83.3%) remained with the program for its full 2 school years. Thus, 12 of the 15 enrollees known to have left the program only did so after at least 1 year of participation and, in all 12 cases of late dropout, the reason for leaving the program was a move out of the state. Three families withdrew from the program, for reasons unknown, before the end of the first year. Following the principle of intention-to-treat analyses, all children who had been offered the program and had school readiness scores in first grade, have been included as PCHP subjects in the present report.

These analyses therefore involve 84 former PCHP first graders who were still living in South Carolina and whose CSAB scores were available. Seventy-nine of them were still in the Florence District 3 at the time of the follow-up, while five had moved away into other South Carolina school districts from which it was possible to retrieve their school readiness test scores and include them in this follow-up study.

As the measure of school readiness, the research team examined, in the fall of 1997, 1998, 1999, and 2000, the scores that the children in each PCHP cohort achieved on the Cognitive Skills Assessment Battery or “CSAB” (Boehm & Slater, 1966). The CSAB gauges first graders’ strengths and weaknesses in 12 major objectives: performs tasks involving gross motor skills, performs tasks involving fine motor skills, remembers visual stimuli, determines likenesses and differences in visual stimuli, remembers auditory stimuli, determines likenesses and differences in auditory stimuli, communicates with others by using expressive language, is receptive of language in communicating with others, classifies stimuli on the basis of one or more attributes, compares stimuli on the basis of one or more attributes, sequences stimuli on the basis of one or more attributes. The teacher gives the CSAB individually to each child and thus learns immediately how best to plan an appropriate program for that child. The 12 CSAB subscales are not scored, so that the CSAB yields only a total score, with 116 being the highest possible score. A CSAB total score of 88 is the cutoff score that shows children’s school readiness as determined by the South Carolina State Department of Education. A lower score is a child’s signal to the teacher of a need for special help toward school readiness.

Early in the fall of each school year the CSAB is given to all first graders throughout the state of South Carolina, with the exception of an unknown number of children with handicaps. Based on data sent by the school districts, statewide results on the CSAB are reported yearly by the South Carolina State Education Department. The data are broken down in the yearly report to include the number and percentage of students who achieved the “passing” CSAB score of at least 88 for several subgroups of children within the whole state, among them students receiving free lunch because of low-income eligibility and students identified as African Americans (South Carolina State Department of Education, CSAB Reports, 1997–2000). The CSAB pass rates of the 84 PCHP subjects and of their free-lunch and African American subgroups were compared with those reported for all first graders in the state for the years 1997 through 2000, and, in separate comparisons, with the scores of the whole state’s free-lunch and African American subgroups. Comparison data are also available for the school district.

Among the PCHP graduates in these analyses, seven of the 20 first graders tested in 1998 were unusual in having been referred to the PCHP for entrance into the program in 1994 by the Florence County Disability and Special Needs Board, after being diagnosed as having severe developmental delay (SDD). This delay was likely to have been organic in origin, rather than being environmentally caused, since it was evident by age 2 (Zadig & Crocker, 1975). All seven of these children were again identified as having SDD at age 5 in kindergarten, were assigned to enter the district’s Special Services class after completing first grade, and had the Individual Educational Programs created for them which are required for Special Services entrance. The seven SDD/PCHP first graders in the Florence 3 District took the CSAB and produced the failing scores to be expected of children with their disability. Some children with Individual Educational Programs, including but not limited to those with SDD, were excluded from taking the CSAB in some South Carolina school districts, but the number of districts that followed this policy is unknown (personal communication, Dr. Teri Siskind, Director of Assessment, South Carolina Department of Education). In the present follow-up study, the

PCHP group was therefore analyzed both with and without the seven 1998 SDD children. The statistical analyses presented in the tables and figure were performed using chi-square and *t*-tests for categorical and continuous variables, respectively.

### 3. Results

#### 3.1. Subjects

Table 1 describes the background, demographic and program characteristics of the subjects, 84 former PCHP children, and their parents. It shows that of the 84 children,

Table 1  
Characteristics of PCHP children studied in 1997–2000 on entering first grade in one South Carolina school district

Categorical variables	All PCHP children			Only non-SDD children				
	<i>N</i>	Number (%) with characteristic		<i>N</i>	Number (%) with characteristic			
Male	84	45 (53.6%)		77	40 (51.9%)			
Ethnicity								
African American	84	75 (89.3%)		77	68 (88.3%)			
Euro American	84	9 (10.7%)		77	9 (11.7%)			
Attended pre-K	84	65 (77.4%)		77	58 (75.3%)			
Free lunch	84	8174 (96.1%)		77	74 (96.1%)			
SDD	84	7 (8.3%)		77	–			
Year of entering first grade								
1997		18 (21.4%)			18 (23.4%)			
1998		20 (23.8%)			13 (16.9%)			
1999		23 (27.4%)			23 (29.9%)			
2000		23 (27.4%)			23 (29.9%)			
Extent of exposure to PCHP	<i>N</i> = 83			<i>N</i> = 76				
Full 2 years (≥ 120 home sessions)		72 (86.8%)			66 (86.8%)			
1 year (60–119 home sessions)		8 (9.6%)			8 (10.5%)			
Minimal (< 60 home sessions)		3 (3.6%)			2 (2.6%)			
Mother worked during PCHP	70	33 (47.1%)		63	31 (49.2%)			
Mother was PCHP home session parent	84	84 (100%)		7	77 (100%)			
Continuous variables	<i>N</i>	Mean	(S.D.)	Range	<i>N</i>	Mean	(S.D.)	Range
Child's month age at PCHP entry	84	31.5	(4.2)	21–35	77	31.4	(4.3)	22–46
Mother's age in years	82	25.8	(6.1)	19–50	75	26.0	(6.3)	19–50
Father's age in years	32	33.1	(7.7)	23–61	28	34.2	(7.5)	24–61
Mother's education in years	82	11.4	(1.9)	5–18	75	11.5	(1.8)	5–18
Father's education in years	34	11.3	(1.5)	8–16	30	11.3	(1.5)	8–16
Number of home sessions	83	113.9	(22.8)	10–124	76	114.5	(21.9)	10–124
Number of toys/books	83	57.2	(11.5)	5–69	76	57.4	(11.0)	5–69

79 (94.1%) demonstrated poverty status on the basis of receiving free lunch, and 75 (89.3%) were African American; the percentages changed only minimally when the seven children with SDD were excluded. Nine others were Euro-American; none of them were SDD children.

Table 1 also shows the child's mean month age at entry into the program (31.5, S.D. = 4.2), the number in each first grade PCHP cohort (18–23), gender in the total group of 84 (45 male and 39 female), and the children's degree of exposure to the components of the PCHP (the number of home sessions and of gifts of toys and books). It can be seen that 72 of the 83 subjects on whom information is available had completed 2 years of the program, and 8 of the remaining 11 had completed at least 1 year. According to Table 1, the PCHP children had received a mean of 113.9 home sessions and a mean of 57.2 toys and books.

Sixty-five PCHP children (77.4%) attended preschool between participation in the PCHP and kindergarten, including 58 of the 77 in the non-SDD group, or 75.3% of that group. Thus, 19 had not attended preschool after the PCHP.

The parent participant in the home sessions was always the mother but Table 1 shows demographic data regarding both parents, complete only for mothers' age and education. It should be noted that all four cohorts of these children received almost 25% more Home Sessions and toys and books than is usual in the PCHP (Levenstein, 1988).

It is also of note that 33 participating mothers were doing paid work away from home, that six of the seven SDD children stayed in the program for its full 2 years (as much an indicator of the mothers' cooperation as of the children's interest), and that only 32 of the fathers lived in the home. The mean grade level of education was similar for both parents: grade 11.4 for mothers and 11.3 for fathers, almost the same whether or not parents of SDD children were included in these means.

### 3.2. Efficacy

Table 2 compares PCHP graduates with all first graders in South Carolina. It shows the percentage of first graders in the whole state who achieved the passing score of at least 88 on the CSAB (the cutoff score determined by the South Carolina State Department of Education)

Table 2

Passing rates on CSAB in first grade for former PCHP toddlers in one South Carolina school district and for statewide comparison groups, 1997–2000

	South Carolina (SC)		All PCHP			Only non-SDD <sup>a</sup> PCHP		
	<i>N</i>	% School ready <sup>b</sup>	<i>N</i>	% School ready	<i>p</i> (vs. SC)	<i>N</i>	% School ready	<i>p</i> (vs. SC)
All first graders	211,649	82.4%	84	84.5%	ns	77	92.2%	<.05
Free lunch	94,510	74.4%	81	85.2%	<.05	74	93.2%	<.001
African Americans	91,882	75.6%	75	84.0%	ns	68	92.7%	<.05
Euro Americans	113,469	88.6%	9	88.9%	ns	9	88.9%	ns

<sup>a</sup> Children diagnosed before PCHP entry as having severe developmental delay.

<sup>b</sup> "School ready" is defined as having a CSAB score of  $\geq 88$ .

as well as the percentage of passing scores for each subgroup of statewide first graders and for the corresponding groups and subgroups of PCHP children. It can be seen from Table 2 that the pass rate of the PCHP students was slightly higher (but not significantly so) than the rate of all students statewide, including those not at-risk, despite the markedly at-risk status of the PCHP children. When SDD youngsters were excluded, the PCHP group attained a significantly higher pass rate than the whole statewide mean (92.2% vs. 82.4%). Statewide, pupils eligible for free lunch performed considerably less well than all pupils in the state. Yet the pass rate of the PCHP free lunch subgroup not only was significantly superior to the 74.4% pass rate of the statewide free lunch subgroup, whether or not the PCHP SDD children were included, but was in fact higher than that of all first graders in the state. It is of note that the PCHP free lunch subgroup's pass rate arose to 93.1% when the SDD children were excluded from the analysis.

The pass rate of African American children was, similarly, significantly superior to that of statewide African American children — and, indeed, to that of all statewide children regardless of ethnicity — when SDD children were excluded from the analysis. Their superiority persisted, though not at a statistically significant level, when the SDD children were included.

When the pass rates of African Americans were compared with those of Euro-Americans in the state as a whole, the South Carolina African American first graders statewide from all income groups performed substantially less well than all Euro Americans. For African Americans who had been in the PCHP, this gap was diminished, and the gap was more than closed if SDD children were excluded from the analysis.

Performance on the CSAB among Florence 3 first graders was somewhat better than in the state as a whole, with 86.3% of free lunch youngsters and 85.2% of African Americans rated as school ready on the CSAB ( $p < .001$  in both cases). These pass rates were similar to those of all PCHP graduates but inferior to those of the nondevelopmentally delayed PCHP graduates ( $.05 < p < .1$ ).

When the district's CSAB pass rates were also compared year by year (Table 3), the exceptionally high risk PCHP children could be seen to perform substantially (6 to 8 percentage points) better than the non-PCHP Florence 3 free lunch children in each year except 1998, though these differences were not statistically significant because of small numbers. Summing the performance of free lunch children in those 3 years when no SDD children were involved, 93.2% of PCHP first graders and 87.0% non-PCHP Florence 3 children passed the CSAB.

For the state of South Carolina, CSAB results have been reported only as pass rates, without absolute scores. Limited data regarding absolute CSAB scores are available for the Florence 3 district, though without Standard Deviations and without scores for the at-risk subgroups; the mean absolute CSAB scores from first graders in the years 1997–2000 were nearly the same among high-risk, non-SDD PCHP graduates (97.6; 96.2 if SDD children are included) as among all Florence 3 first graders (98.8).

Fig. 1 illustrates visually the success of the PCHP in overcoming two aspects of educational disadvantage. PCHP participation substantially lowered the risks of inadequate school readiness associated in South Carolina as a whole with free lunch eligibility, even though PCHP participants had additional risk factors above and beyond low income. It also

Table 3

Passing rates on CSAB on first grade for free lunch eligible former PCHP toddlers in one South Carolina school district and for statewide and districtwide free lunch comparison groups in four yearly cohorts, 1997–2000

Year	PCHP		Florence 3 school district			South Carolina		
	<i>N</i>	% School ready <sup>a</sup>	<i>N</i>	% School ready	<i>p</i> (vs. PCHP)	<i>N</i>	% School ready	<i>p</i> (vs. PCHP)
1997	18	94.4%	247	87.9%	ns	24,714	70.5%	< .05
1998	20	60.0% <sup>b</sup>	241	86.7%	< .01	24,317	73.0%	ns
1999	22	90.9%	225	81.3%	ns	23,165	76.5%	ns
2000	21	95.2%	236	89.9%	ns	22,314	78.0%	< .1
1997	18	94.4%	247	87.9%	ns	24,714	70.5%	< .05
1998	20	60.0% <sup>b</sup>	241	86.7%	< .01	24,317	73.0%	ns
1999	22	90.9%	225	81.3%	ns	23,165	76.5%	ns
2000	21	95.2%	236	89.9%	ns	22,314	78.0%	< .1
Total: all 4 years	81	85.2%	949	86.5%	ns	94,510	74.4%	< .05
Excluding 1998	61	92.3%	708	86.4%	ns	70,193	74.8%	< .01

<sup>a</sup> “School ready” is defined as having a CSAB score of  $\geq 88$ .

<sup>b</sup> In 1998, the PCHP free lunch cohort included seven children who had been diagnosed before program entry as having severe developmental delay.

markedly lowered the risks associated with being of African American ethnicity. These effects were even more evident when SDD children were excluded from the analysis.

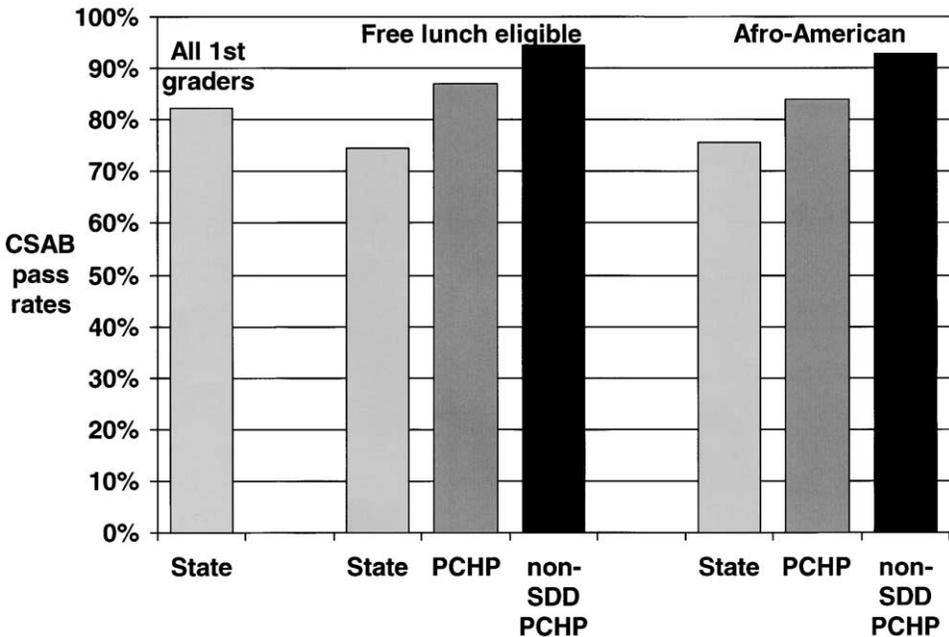


Fig. 1. The PCHP overcomes two aspects of educational disadvantage among children in a South Carolina school district.

### 3.3. Determinants of outcomes

All the participant characteristics listed in Table 1 were examined in relation to performance on the CSAB within the group of PCHP children. As Table 4 indicates, almost none of the participant characteristics examined were related to school readiness. The most important exception was SDD: none of the seven SDD children achieved the cutoff score of 88, in sharp contrast to the non-SDD children. Further, Table 4 shows that children in the PCHP cohort tested in 1998 were less likely to obtain scores equal to 88 or higher on the CSAB. However, as noted above, this cohort differed from the three others in being the only one to include children who had been identified as severely developmentally delayed prior to their participation in the PCHP (35% of the 1998 first grade cohort). When SDD children were excluded from the analysis, PCHP children's performance on the CSAB was similar for all four yearly cohorts.

Out of the 84 PCHP study participants, 65 had attended a center based preschool program ("pre-K"). The school district gave preference to children with the lowest scores on a pre-entry test, so all the children with SDD, predictably falling into this category, entered center-based pre-K programs after participating in the PCHP. This produced an apparent negative effect of pre-K attendance on CSAB scores ( $p < .08$ ). When the data were examined excluding the SDD children, the differences on "pass" scores no longer approached significance (Table 4). Thus, the apparent trend toward a worse outcome for children attending center-based pre-K programs was entirely accounted for by the differential pre-K enrollment of SDD children, none of whom later passed the CSAB.

There are no significant correlations between the CSAB pass rates of the former PCHP first graders who were the participants in this research and any of the other background characteristics included in the study and listed in Table 1, including having received full or only 1 year of the PCHP, ethnicity, gender, age at PCHP entry, the age or education of either parent, or the mother's having paid work outside the home.

When absolute scores rather than pass rates were studied, the only characteristics associated with higher CSAB scores were the absence of SDD (mean score 97.6 vs. 80.7,  $p < .001$ ) and having a mother who worked outside the house (98.9 vs. 93.4,  $p = .01$ ; this latter difference persisted when SDD children were excluded). Girls did nonsignificantly better than boys (98.1 vs. 94.5,  $p = .08$ ), and children of younger mothers did slightly better ( $r = -.22$ ,  $p = .06$ ). There was no association with free lunch eligibility, ethnicity, age on entry, pre-K attendance, or mothers' education.

### 3.4. Replication and implementation

A preventive program's success in the laboratory cannot always be translated into success in the real world (Levenstein, 1992). The PCHP was created from the start with the hope that it could be effective in preventing the educational disadvantage of children at risk because of poverty while being easy and inexpensive to duplicate for implementation. The PCHP has been successfully replicated (implemented) in many locations since research began to demonstrate its effectiveness both by measures predictive of school performance

and by follow-up studies of its graduates' actual academic achievement (Levenstein, 1972). As of September 2001, there were more than 100 active, certified valid replications of the PCHP in the United States and in Bermuda, Canada, and the Netherlands, whose key staff members had received the PCHP's training, evaluation, and ongoing consultation to maintain PCHP standards.

The replication procedures developed over the past 30 years by the PCHP (see Appendix for a list of these procedures) were designed to prevent dilution of the original program, the

Table 4

Determinants of a passing score ( $\geq 88$ ) on CSAB on entering first grade in 1997–2000 for former PCHP toddlers in one South Carolina school district

	<i>N</i>	Number (%) with score $\geq 88$	<i>p</i>
Gender			.13
Female	39	36 (92.3%)	
Male	45	35 (77.8%)	
Ethnicity			.70
African American	75	63 (84.0%)	
Euro American	9	8 (88.9%)	
SDD diagnosed before PCHP entry			<.0001
SDD	7	7 (100%)	
No SDD	77	71 (92.2%)	
Year of testing			.005
1997	18	94.4%	
1998	20	60.0%	
1999	23	87.0%	
2000	23	95.7%	
Year of testing, among children without SDD			.71
1997	18	94.4%	
1998	13	92.3%	
1999	23	87.0%	
2000	23	95.7%	
Preschool experience other than PCHP			.08
Attended pre-K	65	52 (80%)	
No pre-K	19	19 (100%)	
Preschool experience other than PCHP, among children without SDD			.33
Attended pre-K	58	52 (89.7%)	
No pre-K	19	19 (100%)	
Maternal work outside the home at time of PCHP			.27
Mother worked	33	30 (90.9%)	
Mother did not work	37	29 (78.4%)	
Extent of exposure to PCHP, as number of home sessions			.70
Full 2 years ( $\geq 120$ )	72	61 (84.7%)	
1 year (60–119)	8	7 (87.5%)	
Minimal ( $< 60$ )	3	2 (66.7%)	

(continued on next page)

Table 4 (continued)

	CSAB score $\geq$ 88			CSAB score $<$ 88			<i>p</i>
	<i>N</i>	Mean	S.D.	<i>N</i>	Mean	S.D.	
<i>At PCHP entry</i>							
Child's age in months	71	31.5	4.3	13	30.6	4.3	.47
Mother's age in years	69	25.5	6.2	13	27.4	5.7	.32
Father's age in years	24	34.0	8.1	8	30.1	5.7	.22
Mother's education in years	69	11.5	1.7	13	11.2	2.8	.67
Father's education in years	26	11.3	1.9	8	11.4	2.5	.87
<i>PCHP components</i>							
Number of home sessions	70	114.7	21.8	13	109.8	28.1	.48
Number of toys/books	70	57.5	11.0	13	55.6	14.5	.59

“sine qua non” for student change (Cook et al., 1999). Many of its elements are similar to those that have been independently recommended to social programs contemplating replication (Conservation Company and Public/Private Ventures, 1994).

The PCHP replication procedures listed in the Appendix guided the implementation of the South Carolina replication examined here. After training had been completed, this replication followed without change the philosophy and method of the original PCHP in its delivery of the program to every cohort. It did, however, institute one modification in the implementation of the program: the number of home sessions, and therefore the number of books and toys delivered to participants, was increased by almost 25% over the original model, as part of delivering the program year-round. The children described in this report, therefore, had received up to 124 twice-weekly home sessions over 2 school years rather than the 92 home sessions in 46 weeks over 2 years that was the standard in the original program and has been the standard for all PCHP replications (Levenstein et al., 1998).

#### 4. Discussion and conclusions

The degree of parental cooperation is one of the first questions to be asked in judging the success of a home-based parent–toddler intervention to promote an at-risk child's later school achievement; if parents drop out, there can be no program. According to the data presented here, the PCHP in South Carolina's Florence District 3 won a high degree of cooperation from participating parents: all families invited into the PCHP accepted enrollment, 96.7% of those who enrolled stayed for at least 1 year, and 83.3% of all enrollees remained with the program for its full 2 years.

This study also answers the even more important question: Did this South Carolina replication of the PCHP succeed in preparing its at-risk toddlers for later school readiness and probable literacy? The answer is particularly important in view of the lack of school-age cognitive advantages found for graduates of most for a few preschool programs, except center based programs with lengthy duration and other uncommon features. The answer is in the

affirmative for PCHP graduates: the group of at-risk children who had been exposed to the 2-year PCHP as toddlers in four successive cohorts performed up to par on a school readiness test, the CSAB, upon entering first grade in 1997, 1998, 1999, and 2000. Even if the CSAB scores of seven children who had been identified previous to their entrance into the PCHP as having severe, probably organically determined, developmental delay were included in the data analysis, the scores of PCHP children eligible for free school lunches significantly surpassed those of first grade children receiving the poverty-linked free lunch benefit statewide. Since the PCHP enrollment criteria in the Florence 3 school district led to a participant group with more poverty linked handicaps than most free lunch children, this outcome is particularly impressive.

The pass rate for the subgroup of at-risk African American first graders who had been in the PCHP was not better than that of all African American children statewide, low-income or not. It was also higher than the overall pass rate for all South Carolina first graders, a superiority that was statistically significant when the seven SDD children were omitted from the analysis.

In other words, as shown by the Figure, exposure to the PCHP greatly lowered the excess risk of inadequate school readiness associated with being African American and with having a low income as reflected by free lunch eligibility (cf. Brooks-Gunn, Klebanov, & Duncan, 1996).

It should be noted that the CSAB was designed to measure not verbal or quantitative competencies but rather the child's capacity for cognitive/conceptual growth, which is basic to the acquisition of academic skills. The PCHP itself fosters conceptual growth through both verbal interaction and by the constant discussion of specific attributes of the toys and books, and their relations to each other, leading to concepts and thus to the cognitive development essential to attaining literacy and numeracy.

The specific program features that promoted these children's school readiness are not easily separated out from the effects of the program as a whole. Yet, perhaps, several unique elements may be distinguished.

First, as discussed in the Introduction, the PCHP's verbal interaction component, hypothesized as this early intervention's chief ingredient since its inception, is likely to have been mainly responsible for its positive effects. The program's method promotes the constancy of meaning and the symbolic language for it, amid a variety of toys and illustrated books. It is thus rooted in theories of cognitive development: Sigel's hypotheses of the development of meaning through distancing (Sigel, 1964, 1971; Sigel et al., 1991), and the fundamental importance of language to symbolize concepts (Bruner, 1964; Bruner et al., 1966; Vygotsky, 1962). It was also conjectured that the dialogue would continue into the child's elementary school years, as indicated in the follow-up study cited above (Levenstein & O'Hara, 1983, 1993).

Next, the PCHP's encouragement of parent-child attachment through their mutual enjoyment of verbal interaction around toys and books may well have played another major role in the child's later school readiness. By embedding its cognitive curriculum within a strengthened and ongoing affective bond, the PCHP enhances the likelihood that its positive impact on the child's socioemotional growth and thus school success will continue long after the Home Visitors have stopped coming around.

Among the other variables that may have contributed to the success of the PCHP in promoting the school readiness of the at-risk children in this and previous studies are its incentives of gifts of toys and books; the intensive training and continued guidance of Coordinators; the explicit message to parents that they are the most important members of a team to help their children; the minimal nature of the PCHP's method; and the absence of special homework tasks for the parents or the children.

A final and vital element of the PCHP's capacity to promote school readiness is its modeling method. Home Visitors consistently demonstrate, rather than directly teach, a curriculum of parenting skills, especially verbal interaction. This method of only "showing, not telling" may have a more profound function than increasing parents' motivation, important though this is. It appears to be also a concrete way of conveying profound respect for the abilities of parents, in the parent's eyes, this approach perhaps diminishes the Home Visitor role from a dominant position of teacher or counselor to that of a mere "demonstrator" and thus shifts to the parent any power that may be initially perceived as inherent in the Home Visitor. This can strengthen the power of the parent's own role, a role reversal already implicit in the parent's permitting the Home Visitor to enter the home for play/reading demonstration sessions arranged on a schedule set by the parent and faithfully followed by the Home Visitor. Such show of respect may have an enabling effect on the self-esteem of a low-income parent who may at times feel demeaned in the eyes of others by his or her low-income, low education, and perhaps dark skin color, a low parental self-esteem which then may be mirrored by the child in her or his development. These speculations, however, must remain only surmise, as they are based only on the anecdotes of Home Visitors and Coordinators, not on "hard" data produced by objective measures.

A limitation of this study is its lack of randomized controls; the comparison groups of first graders were instead convenience samples. To quote Anderson, Houston, Schmitt, Linebarger and Wright (2001), who used such a comparison group in their recent long-term study of television viewing effects: "As in any research based on convenience samples, there will always be some limitation on how general the results might be with respect to other populations." This necessary flaw in the present study is partially offset by identification and separate analyses within the PCHP and the comparison groups of two subgroups pertinent to the educational disadvantage of the children being studied: free lunch eligibility and African American ethnicity. The lack of randomization may also be somewhat compensated by the consistency of results over several yearly cohorts.

Generalizeability to other PCHP replications is slightly limited, because the PCHP replication that was the focus of this study offered almost 25% more Home Sessions and curriculum materials than in the original program. This change may have influenced subject outcomes, and may have been viewed either as especially burdensome or as especially welcome by its participants. Given the positive results found with this extended version of the PCHP, these issues may merit further investigation.

The limited nature of the PCHP's goals (children's cognitive/literacy growth and school abilities, and parents' increased verbal interaction skills) may seem narrow when compared with the large number of stated goals in some other programs which encompass in their methods many services intended to achieve those goals. Multigoal home visit interventions

have not met with notable success; the Comprehensive Child Development Program (CCDP) is a well-known example (St. Pierre et al. 1997). Indeed, two of its evaluators have concluded, from the lack of significant beneficial effects in its 21 sites, at an annual cost of US\$10,849 per family for 5 years, that home visit programs yield no benefit for adults or children (St. Pierre & Layzer, 1998). Others, more successful than CCDP and more enduring, but with longer time frames than the PCHP and more complex methods, are also well known: Weikart's High Scope program (Berrueta-Clement et al., 1984), Ramey's Abecedarian project (Campbell et al., 2001; Ramey and Smith, 1977), and Reynolds's 23-centers servicing children from preschool to third grade (Reynolds & Temple, 1998; Reynolds et al., 2001). The PCHP was created to take a shorter time (only 2 school years), with limited school achievement goals and a presumption that simplicity of method would facilitate its feasibility and effectiveness.

The relatively narrow boundaries of PCHP goals, which permit a simple and easily monitored method used over a relatively short period of time, may be in the end the most important factor contributing to the success of the South Carolina replication examined in this study as well as in the earlier studies cited above. This conjecture is supported by the successes of another home-visit program (Kitzman et al., 2000; Olds et al., 1997; Olds et al., 1998), serving a similar population, which aims at what appear to be similarly limited goals (economic and health outcomes for mothers) within 2 years and which may work through similar mechanisms (Levenstein & Levenstein, 1999).

The present results add to the body of data from various sites, supporting lasting beneficial effects of the PCHP on the cognitive performance of at-risk children. The importance to society of successful programs was stressed by Karoly et al. (1998), who detailed some of the ways in which the social benefits of successful preventive preschool programs outweigh their monetary costs. Given the mixed reports of the effectiveness of home-based preschool programs (Gomby, Culross, & Behrman, 1999) and the perennial limits of resources, it is vital to understand which interventions do work, examining the concrete details of their methods in order to guide social policy in the choice of programs and, as a side benefit, to obtain insight into just why they work (cf. Gomby et al., 1999). The school readiness of former PCHP toddlers when they reach first grade suggests that the PCHP is such a program, with its practicability underlined by its low cost (about US\$2000 per child per year) and by the almost universal acceptance by its participants.

The simplicity of method and modest goals of the PCHP's approach in achieving children's school readiness, maximizing acceptability to parents and minimizing costs, combined with the easy implementation of the model, seem to suggest that it may sometimes be true for preschool interventions—to quote Mies van der Rohe, a renowned modern architect of simple structures—that “less is more.”

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## Appendix. Procedures for replication of the PCHP

1. Preliminary discussions are held with a local site's sponsor to ascertain the sponsor's willingness and ability to support a replication for at least 2 years (to PCHP's full completion).
2. Local site sponsors agree to adhere to PCHP standards specified in writing.
3. The PCHP or its agents trains new Coordinators to conduct a PCHP replication.
4. Before training, new Coordinators receive a book detailing the theory, method, research, and replication system of the PCHP: *Messages from Home* (Levenstein, 1988). Training is intensive and interactive, with sites having substantial opportunity for one-on-one contact with the trainer both before and after the initial training.
5. By their behavior, trainers model Coordinator interaction with Home Visitors.
6. Coordinators train the Home Visitors in their own PCHP replications (local PCHPs).
7. Replications annually demonstrate their continued adherence to the model's basic features using a PCHP-developed instrument, "KEEP" (Key Elements for Establishing Program).
8. PCHP staff maintains contact with the new local PCHP Coordinator through visits, telephone calls, mailings, Newsletter and an annual Coordinator Conference.
9. Local PCHPs (replications) are certified (validated as authentic) by the PCHP National Center after 2 years, via objective evidence.

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