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The Chicago Child-Parent Centers: A Longitudinal Study of Extended Early Childhood Intervention

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Abstract

In this study, the effects of the Child-Parent Center and Expansion (CPC) Program on scholastic development up to age 14 were reported for a large sample of economically disadvantaged children. The CPC program is a state- and federally funded early childhood educational intervention for children in the Chicago Public Schools who are at risk of academic underachievement due to poverty and associated factors. The CPCs provide comprehensive educational and family support services from ages 3 to 9, for up to six years of continuous intervention. Longitudinal findings from a matched 1989 graduating cohort of 878 program and 286 comparison-group children indicated that (a) any participation in the program was significantly associated with school performance up to eighth grade, (b) duration of participation was significantly associated with school performance, especially for children who participated for five or six years, (c) participation in extended childhood intervention to second and third grade yielded significantly better school performance than participation ending in kindergarten, and (d) longer-term effects of the program were largely explained by cognitive-advantage and family-support factors, both of which are theoretically linked to the program activities.

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INTRODUCTION

Given the widespread concerns about academic underachievement, school failure, and other problematic behaviors in our nation's schools, policy makers and the public at large are increasingly turning to early childhood intervention as a preventive approach to these and other social problems. Support for early childhood programs has been expressed in a number of ways. The first national education goal is that all children will start school ready to learn (National Education Goals Panel 1994). The Head Start preschool program for economically disadvantaged children has nearly universal support and funding priority (Rovner 1990; Zigler and Muenchow 1992). Preschool education programs are expanding at the state and local levels in the belief that children will develop a good foundation for school success. Because the proportion of young children who are poor is 25 percent and growing (Natriello, McDill, and Pallas 1990), the number of children likely to need early intervention also is growing.

In this study, the effects of the Child-Parent Center and Expansion (CPC) Program on scholastic development up to age 14 are reported for a large sample of economically disadvantaged children. The CPC Program is a state- and federally funded early childhood educational intervention for children in the Chicago Public Schools who are at risk for academic underachievement and school failure due to poverty and associated factors. Created in 1967, the CPCs provide comprehensive educational and family support services from ages 3 to 9 for up to six years of continuous intervention. It is the second oldest (after Head Start) federally funded early childhood intervention for economically disadvantaged children and is one of the only extended intervention programs in the United States.

Study children are participants in the Chicago Longitudinal Study, an ongoing investigation of the 1989 graduating cohort of the CPCs and a comparison group of nonCPC participants who

participated in less extensive intervention.[1] To summarize, I discuss the research and policy context of early childhood intervention, describe the development of the CPCs and the Chicago Longitudinal Study, and report short- and long-term effects of the 1983–89 program implementation. Special attention is given to age 14 (eighth grade) findings for reading and math achievement, incidence of grade retention and special education placement, and life-skills competence.

RESEARCH AND POLICY CONTEXT

Studies of model and large-scale programs over the past two decades have convincingly demonstrated that good-quality early childhood interventions for economically disadvantaged children improve their cognitive and affective readiness for school and can promote longer-term school success such as greater school achievement, lower incidence of grade retention and special education placement, and less problematic behavior (Barnett 1992; Berrueta-Clement et al. 1984; Consortium for Longitudinal Studies 1983; McKey et al. 1985; Campbell and Ramey 1994). Effective programs vary considerably in their timing, duration, and their targets of intervention. Center-based educational support programs that have focused on cognitive enrichment, family-support programs that have focused on home-based parenting education, and combination programs have all been shown to promote children's development during the sensitive period prior to school entry (Seitz 1990; Yoshikawa 1994), although program intensity appears to be an key ingredient of success (Ramey and Ramey 1992).

Although these findings have enriched the educational and policy research base in human development and education, three important substantive issues remain that have not been adequately addressed. First, the amount and quality of existing evidence concerning the long-term effects of large-

[1]Although the year of graduation from the Child-Parent Center and Expansion Program depended on the number of years the program was available at the school (two or three years), 1989 (third grade) was the last possible year of program participation. Consequently, 1989 rather than 1988 is used as the sample identifier.

scale government-funded programs are inadequate to inform public policy. As repeated often, but frequently forgotten, most of the evidence on long-term effects into high school comes from small-scale model programs that differ in significant ways from large-scale established programs like Head Start (Crum 1993; Haskins 1989; White 1985; Woodhead 1988; Zigler and Styfco 1993). Model programs are usually more expensive to operate than large-scale programs, have larger and better trained staffs, and are rarely implemented in inner-city communities. Studies of large-scale programs typically rely on retrospective quasi-experimental designs and are more likely to suffer from problems regarding noncomparability of groups, attrition, and limited postprogram data (Barnett 1992; Haskins 1989). Such problems make findings difficult to interpret. On the positive side, however, large scale programs have longer implementation histories than model programs and include larger samples which increase statistical power and generalizability of findings. Although studies of model programs indicate how effective early interventions *can be,* policy makers and the public are most interested in knowing how effective current large-scale programs *are.* In a time of intensive fiscal accountability at all levels of government, research on the effects of large-scale programs is needed more than ever.

A second major substantive issue is that research has not determined the optimal timing and duration of intervention exposure. Although it is increasingly believed that a one- or two-year preschool program cannot immunize children from school failure, the optimal length of intervention is not clear (Zigler and Styfco 1993). Do two or three years of intervention beginning at age 3 yield the same effect as two or three years beginning at age 5? Do programs that extend into the primary grades yield more long-lasting effects than programs that stop in kindergarten? Unfortunately, most studies confound the effects of timing and duration of intervention (e.g., Seitz et al. 1983; Fuerst and Fuerst 1993; Madden et al. 1993). One exception is the Abecedarian Project (Campbell and Ramey 1994, 1995), which has traced 93 children who participated to varying degrees in a model intervention in Chapel Hill, North Carolina, from birth to age 8. Investigators found that participation in the five-year preschool program was

positively associated with higher cognitive ability and school achievement as well as lower grade retention and special education placement up to age 15. The three-year school-age program was found to have limited independent effects and was associated only with reading achievement at age 15. Certainly, more evidence is needed, especially given recent proposals to extend programs into the primary grades (Zigler and Muenchow 1992).

A final question that has not been addressed adequately by previous research concerns the factors and processes that mediate long-term effects of early childhood intervention. Once a direct relationship is established between program participation and the outcome variable of interest, the precise mechanisms or pathways that produce this main effect must be identified (Wachs and Gruen 1982; Woodhead 1988). Two hypotheses have been postulated as explanations of longer-term effects of early childhood intervention. In the cognitive advantage hypothesis, the immediate positive effect of program participation on cognitive development at school entry initiates a positive cycle of scholastic development and commitment that culminates in improved developmental outcomes in adolescence and beyond (see Berrueta-Clement et al. 1984; Schweinhart, Barnes, and Weikart 1993). In the family support hypothesis, the longer-term effects of intervention occur to the extent that family functioning has been improved. Because early intervention programs often involve parents, it is believed that family processes must be impacted to produce longer-term effects (Seitz 1990).

Knowledge about the pathways of the effects of early childhood intervention has significant implications for research and practice. First, it adds to basic theoretical knowledge of how early interventions exert their effects over time in conjunction with other influences. Second, the pathways that are identified can be used to help design and modify intervention programs for children and families. The above hypotheses, for example, direct attention to different intervention approaches, one being child-centered and another parent-focused. Finally, investigation of pathways of effectiveness provide

confirmatory evidence of program impact: Are the identified processes consistent with the theory of the program?

BACKGROUND OF THE CHILD-PARENT CENTER PROGRAM

The CPC Program is a center-based intervention that provides comprehensive educational-support and family-support services to economically disadvantaged children and their parents. The CPCs were created in 1967 to serve families in high-poverty neighborhoods that were not being served by Head Start or other similar programs. The CPCs are funded through Title I of the federal Elementary and Secondary Education Act. Since 1978, the primary-grade portion of the program (expansion program) has been funded by Title I through the State of Illinois. The Chicago Public Schools currently operate twenty-four CPCs; twenty have services from preschool to third grade and four have services only in preschool and first and second grades. The major rationale of the program is that by providing a school-stable learning environment during the preschool and primary-grade years in which parents are active participants in their children's education, scholastic development will follow.

To be eligible, children must reside in school neighborhoods that receive Title I funds. Title I funds are given to schools serving high percentages of low-income families. As with most programs, children must demonstrate educational need and parents must agree to participate in the program. To enroll children who are most in need, and reduce self-selection, the centers conduct outreach activities such as distributing program descriptions in the community, visiting families door-to-door, and advertising locally. The CPCs are located among the most disadvantaged neighborhoods in Chicago. On average, 66 percent of the families in these school communities are poor. The average neighborhood poverty rate for the Chicago Public Schools is 42 percent.

The Chicago Longitudinal Study includes all children (n = 1,150) who enrolled in the twenty CPCs with preschool and kindergarten programs beginning in the fall of 1983 and graduated from

kindergarten in spring of 1986. Children enrolled at ages 3 or 4 could continue their participation up to age 9 in the spring of 1989 (end of third grade). Some children received services from the CPCs in kindergarten and participated in the primary-grade portion. Since children entered and exited the program at different ages, there was significant natural variation in the duration of participation (from 1 to 6 years). Also, six of the twenty centers offered the intervention through third grade while the other centers offered it through second grade. This variation in program services is shown in Table 1. Consequently, the relationship between duration of participation and adjustment can be investigated.

The nonCPC comparison group included 389 children who graduated in 1986 from government-funded all-day kindergarten programs from six randomly selected schools that serve large proportions of low-income families. The schools participated in the Chicago Effective Schools Project, a school system program to meet the needs of high-risk children. These schools matched the poverty characteristics of the CPCs and, like CPC participants, children were eligible for and participated in government-funded programs. They had no systematic intervention experiences from preschool to third grade, although some enrolled in Head Start.

The sample characteristics of the original CPC program and comparison groups are displayed in Table 2. The CPC program group includes children with any participation in the program from preschool to grade 3. At the beginning of the study, the groups were similar on several characteristics including school poverty, sex, race, and SES as proxied by eligibility for free lunch. Program participants had parents with a higher rate of high school graduation and greater number of brothers and sisters. These will be taken into account in estimating program effects. Of the original sample of 1,539 children, 1,164 (76.5 percent) were active in the Chicago Public Schools in eighth grade (77 percent of program group and 72 percent of comparison group). No selective attrition has been found between program and comparison groups (see Reynolds 1994, 1995a).

TABLE 1

1985–1986 Kindergarten Cohort in the Chicago Longitudinal Study

Program Groups	Year	Sample Size	N of Sites	Program Start Date	Years/Extent of Intervention Exposure			Range of Ages
					Pre-K	K	School age	
1. Original Child-Parent Centers	1986 1994	325 238	6	1967	1 or 2	Full-Day	3	3 to 6
2. Later Child-Parent Centers	1986 1994	649 524	14	1970	1 or 2	Full-Day Half-Day	2	3 to 5
3. No-preschool CPC Comparison 1	1986 1994	176 116	6	—	None	Full-Day	3	1 to 4
4. No-CPC Comparison 2	1986 1994	389 286	6	—	Mostly none	Full-Day	None	0
Total	1986 1994	1539 1164	25	—	—	—	—	

Note: School-age (Expansion) component included first, second, and third grades. The total number of different sites was 25 because groups 1 and 3 enrolled in the same sites and groups 2 and 4 overlapped by one site.

TABLE 2

Original Sample Characteristics of the CPC Program and Comparison Groups

Characteristic	Program Group	Comparison Group	F	p
Percentage Girls	50.0	50.5	0.03	.870
Percentage Black	95.6	94.8	0.36	.548
Age in Kindergarten	63.3 (3.7)	63.8 (4.0)	3.08	.079
Percentage HS graduate	59.7	50.9	5.36	.021
Percentage with free lunch	84.2	82.10	.58	.447
School poverty (% families poor)	66.5 (8.7)	67.5 (11.6)	3.29	.070
Number of children	2.4 (1.6)	2.7 (1.8)	4.13	.043
Years of program participation	3.68 (1.32)	—		

Children in the comparison group of this quasi-experimental study did not enroll in the CPCs primarily because they did not live in the neighborhood of a center. Thus, geographic location rather than family motivation determined nonparticipation. Some comparison-group children, for example, participated in Head Start. Reynolds and Temple (1995) found that preschool participation can be predicted with 86 percent accuracy from child, family, and school-level information.

Why did children who enrolled in the CPCs leave before the end of the program? Some parents preferred to send their children to regular school programs. They enrolled their children in the preschool and kindergarten with the intention of moving after the kindergarten component. Other parents moved out of the school neighborhood for professional (e.g., job change) or personal reasons.

Program Components

Like the Head Start program, the CPCs provide comprehensive services, require parent participation, and implement child-centered approaches to social and cognitive development for economically disadvantaged children. There are three distinguishing features of the Child-Parent Centers. As part of the school system, the CPCs are administrative centers housed in separate buildings or in wings of their parent elementary school. They also staff a parent room. Head Start programs typically contract with social service or community agencies, and not with school systems. They do not have staffed parent rooms in addition to classrooms, although they do provide screening services on site. Second, eligibility for the CPCs is based primarily on neighborhood poverty; for Head Start it is primarily family-level poverty. Since both programs give preference to children most in need, this distinction is more illusory than real in practice. Both programs require parent involvement. A third and most important difference is that the CPCs provide up to six years of intervention services from ages 3 to 9 while Head Start is primarily a preschool program. Thus, the CPC program combines Head Start and Follow Through programs to provide the opportunity of a school-stable environment during preschool and the early primary-grade years.

The organizational components of the CPCs are shown in Figure 1. Each center has a head teacher who coordinates the curriculum and parent involvement components, the outreach and physical health services. The head teacher reports to the principal of the parent elementary school. The CPC Program has been consistently implemented with success based on classroom observations, interviews, and school records (Chicago Public Schools 1986, 1987; Reynolds 1994).

Head Teacher. The head teacher is the program coordinator with overall responsibility for organizing and implementing program services. This primarily involves teaming with the parent-resource teacher, the school-community representative, and the classroom teachers and aides. The full-time head teacher also organizes in-service training and workshops for classroom staff. Administrative support staff including a clerk and secretary help the head teacher administer the program.

Child Development Curriculum Component. The CPCs offer a half-day preschool program (three hours), full-day kindergarten program at most sites (six hours), and full-day primary-grade services (six hours). Although no uniform curriculum is provided, the relatively structured classroom activities are designed to promote basic skills in language and reading as well as good social and psychological development. To implement individualized learning activities, class sizes are small and each classroom has a teacher aide. In-service training is provided on a regular basis in conjunction with the Department of Early Childhood Programs.

In preschool, class sizes were, on average, 17 children per teacher. With a teacher aide for each class, the teacher-to-child ratio is 1 to 8. In kindergarten and the primary grades, class sizes averaged 25 children per teacher with a teacher aide, for a staff to child ratio of approximately 1 to 12. Parent volunteers may further reduce these ratios, especially in preschool and kindergarten. The smaller class sizes allow for child-centered approaches to language and cognitive development as well as social relations. Children learn to read and write through a broad spectrum of experiences such as small group activities, shared reading, and journal writing. In this process, teachers provide frequent feedback and

Figure 1 not available for the online web version of this paper. Print versions of the figures are available from the author.

positive reinforcement as well as emphasize task accomplishment. Also, teachers frequently read stories to the class to develop the idea that reading is enjoyable and to demonstrate "book language." Classes also go on field trips to, for example, the Museum of Science and Industry and the zoo. Being certified in early childhood education, classroom teachers provide developmentally appropriate activities. In preschool and kindergarten, the focus is on foundations of language development such as recognizing letters and numbers, oral communication, listening, and an appreciation for reading and drawing. In the primary grades, the focus is on the acquisition and reinforcement of basic skills in reading and math.

Parent Involvement Component. The centers make substantial efforts to involve parents in the center and the education of their children. At least one-half day per week of parent involvement in the center is required. The full-time parent-resource teacher organizes a parent room within the center to implement parent educational activities, initiate interactions among parents, and foster parent-child interactions.

As shown in Table 3, a wide range of activities are encouraged in the program including parent room activities, classroom volunteering, participation in school activities, and opportunities for further education and training. The diverse activities are designed to accommodate parents' daily schedules and different needs. As the program's title indicates, a central operating principle of the program is that parent involvement is a critical socializing force in children's development. Direct parent involvement in the program is expected to enhance parent-child interactions as well as attachment to school, thus promoting school readiness and social adjustment.

School-Community Outreach Services. The full-time noninstructional school-community representative in each center provides outreach services to families in three related areas. First, they identify families in the neighborhood who are in most educational need. They make door-to-door visits of likely participants, distribute brochures and advertisements of enrollment, and communicate in formal and informal ways. Second, the school-community representative conducts a home or school visit to all

TABLE 3

Types of Parent Involvement in the Child-ParentCenters

Examples of Parental Involvement	Relative Focus
Volunteer in the classroom	Medium
Read to small groups	
Go on field trips	
Supervise play activities	
Play games with small groups	
Participate in Parent Room activities	High
Participate in parent reading groups	
Complete craft projects	
In-services in child development, financial management, cooking, and home economics	
Participate in school activities	High
Attend meetings and programs	
Attend parent-teacher conferences	
Attend social events	
Enroll in educational courses	Low
Enroll in parent education courses	
Complete high school coursework	
Home support activities	High
Receive home visits	
Interact with child through reading and playing	
Go to library with child	

Note: Ratings are based on teacher interviews, classroom observations, and the program theory.

enrolling families. One visit upon enrollment in the program is required. Additional visits occur on a most-in-need basis. Moreover, informal conferences are held between the parent and the school-community representative. Finally, the school-community representative mobilizes resources by referring families to community and social service agencies such as employment training, mental health services, and welfare services. Also note that transportation services are provided to children as well as parents.

Physical Health and Medical Services. Upon entry into the program, children undergo a health screening from a registered nurse on-site. Tests are given for vision and hearing. Parents are expected to provide records of their child's immunization history. Special medical and educational services such as speech therapy also are available. All children receive free breakfasts and lunches.

Differences between Preschool/Kindergarten and Primary-Grade Components. Although the continuity of program services from preschool to second or third grade is the distinguishing characteristic of the Child-Parent Centers, there are two differences between the preschool and school-age components. First, the primary-grade (expansion) program is implemented in the parent elementary school rather than in the Child-Parent Center. At least 50 percent of the children in each classroom are from the CPCs. Second, program coordination is streamlined. The head teacher and the parent-resource teacher are combined into one position (curriculum parent-resource teacher), although the parent involvement component does not change. Moreover, the school-community representative serves the whole school, not just children from the CPCs.

DATABASE IN THE CHICAGO LONGITUDINAL STUDY

Since 1986, the Chicago Longitudinal Study of the Child-Parent Centers has investigated the impact of participation in early childhood intervention on children and families as well as the contribution of individual, family, and school-related factors. Yearly data have been collected from school system records, including standardized test scores, to determine children's progress. Beginning in

kindergarten, teachers, parents, and children have been surveyed and interviewed about children's scholastic, social, and psychological development. These and other data are compiled in the project codebook (Reynolds, Bezruczko, Mavrogenes, and Hagemann 1996). Thus, this longitudinal study provides a rare opportunity to investigate long-term effects of a large-scale program for different levels of participation as well as the possible sources of intervention effects.

Table 4 reports the variables that have been used to investigate the effects of the CPC program. For brevity, only findings for reading and math achievement, cumulative grade retention and special education placement, and life-skills competence will be reported, as they are most connected theoretically to program enrollment. (For reports on other outcomes, see Reynolds, Mehana, and Temple 1995 and Reynolds 1994, 1995a.)

RESEARCH FINDINGS

Findings will be reported for four major questions that have been a focus of the study. Outcome data in eighth grade (spring 1994) will be emphasized, including the newly reported measure of life-skills competence.

Question 1: Is Any Participation in the Program Associated with School Performance?

To obtain conservative estimates of the impact of the CPC program, the performance of CPC participants was compared to comparison-group participants without regard to the extent of program participation. Results of the multiple regression analyses are presented in Tables 5 and 6. The explanatory variables included the dichotomous program variable, the demographic factors in Table 2, plus a composite indicator for missing demographic data.[2] In these and other analyses reported below,

[2]The missing-data indicator is the number of family background variables with missing responses. They include parent education, lunch subsidy, number of children, and kindergarten age. It was included in the model after plugging in each missing value with an estimate (see Cohen and Cohen 1983).

TABLE 4
Measures Used to Investigate Program Effects

Measure	Collected in Grades
Demographic Factors	
Children's sex, race, age in months	K
Parents' educational background, eligibility for free lunch, family structure and size	2 to 6
School SES	K
Program Participation	
Participation in preschool and kindergarten, grades 1 to 3	Pre-K to 3
Duration of participation (0 to 6 years)	Pre-K to 3
Child Outcomes	
Reading comprehension and mathematics—total scores on the Iowa Tests of Basic Skills (1988 norms, standard scores)	K to 8
Life skills competence (Raw scores on the 63-item Minimum Proficiency Skills Test)	8 and 9
Example item: "Mary wishes to buy a new car and needs a loan from the bank to buy the car. What is a loan?")	
Grade retention (Cumulative incidence)	K to 8
Special education placement (Cumulative incidence)	K to 8
Parent participation in school (Teacher and parent ratings)	1 to 6
Delinquency behavior (School records)	7 and 8
Self-perceptions of competence (ratings on items such as "I am smart" and "School is important")	3 to 6
Teacher ratings of school adjustment (ratings on classroom adjustment and socioemotional development)	K to 7

TABLE 5

Adjusted Means of CPC Program and Comparison Groups for Reading and Math Achievement Over Time

	Reading Achievement in Grade			Math Achievement in Grade		
Groups	3	5	8	3	5	8
Any CPC participation	98.6	112.8	146.1	101.8	118.5	148.4
No Participation	92.9	109.8	142.3	97.6	114.7	144.9
Difference	5.7**	3.0*	3.8	4.2**	3.8**	3.5*
Effect size	.34	.17	.17	.32	.24	.19
Sample size	1289	1234	1158	1289	1234	1158

Note: Iowa Tests of Basic Skills (ITBS) standard scores are based on a moving average (ranging from 40 to 250).

*p < .01
**p < .001

TABLE 6

Grade 8 Adjusted Means of CPC Program and Comparison Groups for Life Skills Competence, Grade Retention, and Special Education Placement

Group	Life-Skills Competence	% Ever Retained	Years in Special Education
Any CPC participation	40.7	25.3	0.6
No participation	37.7	36.5	0.9
Difference	3.0**	-11.2**	-.3**
Effect size	.28	—	16
Sample size	1158	1164	1164

Note: Iowa Tests of Basic Skills (ITBS) standard scores are based on a moving average (ranging from 40 to 250).

*p < .01
**p < .001

inclusion of the demographic variables generally reduced the size of the program effect by 10–15 percent.

At the end of the program in third grade (one-year postprogram for second-grade graduates), CPC graduates had significantly higher scores than comparison-group peers in reading and math achievement. The program group's 5.7 and 4.2 point advantage in reading and math achievement (about 4 to 5 months of performance), respectively, correspond to effect sizes of .34 and .32 standard deviations. An effect size is the mean difference between groups divided by the pooled standard deviation of the outcome variable. These significant differences remained stable up to the end of eighth grade. The magnitude of the effect sizes declined over time, however.

CPC participants were significantly less likely to be retained in grade and receive special education services than their comparison-group peers. After accounting for differences in child and family background, the program group had a 31 percent lower rate of grade retention (25.3 percent versus 36.5 percent) and spent .30 fewer years in special education than the comparison group. Interestingly, the magnitude of the estimated effects on grade retention and special education placement increased over time. Reynolds (1994) reported a 27 percent lower rate of grade retention between groups in third grade (19.2 percent versus 26.2 percent) and no significant differences for special education placement.

Adjusted means also are reported for life-skills competence. No other studies of early intervention have utilized such an indicator of social competence. The Minimum Proficiency Skills Test measures consumer life skills in seven domains including personal finance, health, transportation, occupations, communication, and government. This reliable test is administered in eighth grade and students are required to obtain a passing score (> 60 percent items correct) before graduating from high school (see Reynolds and Bezruczko 1989, for psychometric characteristics).

CPC graduates answered, on average, three more items correctly than did the nonCPC comparison group (40.7 to 37.7), for an effect size of .28 standard deviations. Program participants also had a 20 percent higher rate of passing than nonprogram participants (63 percent to 50 percent).

Preschool Effects. A related question concerns the effect of preschool participation. Table 7 shows the adjusted means of children who participated in the CPC program in preschool and kindergarten and all other sample participants. The latter participated in kindergarten programs in the CPCs at age 5 or in the comparison group schools but had no preschool participation.

After controlling for demographic variables plus program participation in the primary grades, preschool participation was associated with a 5.4-point gain in reading achievement, a 4.3-point gain in math achievement, and a 2.7-point gain in life-skills competence. Respective effect sizes are .24, .23, and .26. Any preschool participation was associated with a 25 percent reduction in grade retention (24 percent versus 31.8 percent) and .40 fewer years in special education.[3] Group differences for primary grade participation also were estimated. Any participation in a primary grade program was significantly associated with higher life-skills competence (effect size = .14) and a lower rate of grade retention (24 percent versus 31 percent or a 23 percent decline). Because these results do not take duration of participation into account, findings should be interpreted cautiously.

The preschool findings are consistent with those reported in grades 5 and 6 (Reynolds 1995a) and with findings based on alternative methodologies for detecting selection bias. Using the Heckman two-stage econometric technique and the latent covariance psychometric technique, Reynolds and

[3]The magnitude of the effects of preschool participation is larger when only children who attend kindergarten programs in the CPCs without preschool experience were included. Effect sizes were .39, .36, .33, and .35 for reading achievement, math achievement, life-skills competence, and years in special education. The rate of grade retention was 24.0 for the program group and 30.9 for the comparison group. Although not officially in CPC kindergartens, these 115 children received services in the centers and many were in the same kindergarten classrooms as their CPC peers. They also participated in the primary-grade component.

TABLE 7

Grade 8 Adjusted Means of CPC Preschool and Comparison Groups for Five Outcomes

Group	Reading Achievement	Math Achievement	Life Skills	% Retained	Years in Special Education
Preschool Partic.	147.4	149.4	41.2	24.0	.51
No Preschool Partic.	142.0	145.1	38.5	31.8	.87
Difference	5.4**	4.3**	2.7**	-7.8**	-.36**
Effect size	.24	.23	.26	—	.23
Sample size	1158	1158	1159	1164	1164

Note: Iowa Tests of Basic Skills (ITBS) standard scores are based on a moving average (ranging from 40 to 250).

*p < .01
**p < .001

Temple (1995) found preschool effect sizes of .32 in sixth grade. These effects were similar to ordinary regression analysis and did not differ across model specification.

Question 2: Is Duration of Participation Associated with Children's Scholastic Performance?

Because children participated in the program up to six years, the relationship between years of participation and school performance was investigated. If a dosage-response relationship is established between years of participation and school adjustment, then the likelihood is enhanced that program participation causes better school performance.

Figure 2 charts the relationship between the number of years of participation and five outcomes at the end of eighth grade for 1,164 children. The value of zero is for the nonCPC comparison group. The means are adjusted for differences in demographic variables.[4] School performance increases noticeably after four years of intervention. Five or six years of participation yield the best performance, and the six-year group was above the Chicago Public School average in reading achievement. Most impressively, the cumulative rate of grade retention for the six-year group was below the national average of 18 percent. However, sample children as a group were performing well below the national average in school achievement. In grade-equivalent scores, whereby the national average is 8.8 years, reading achievement was as follows: 6 years = 7.8, 5 years = 7.5, 4 years = 7.0, 3 years = 7.0, 2 or 1 years = 6.7, and 0 years = 6.8.

In a multiple regression analysis with five dummy variables (one for each of the years in Figure 2), participation for four, five, or six years yielded significantly higher math achievement, life-skills competence, and lower rates of grade retention and special education placement than no participation. Only children with five and six years of participation performed significantly better than the nonCPC

[4]The Pearson zero-order correlations were, respectively, .18, .19, .21, -.20, and -.15 for reading and math achievement, life-skills competence, grade retention, and special education placement. These correlations assume linearity and do not take range restriction into account.

Figure 2 not available for the online web version of this paper. Print versions of the figures are available from the author.

comparison group in reading achievement. All of the three- through six-year groups had significantly lower rates of grade retention. Children with one and two years of participation were not distinguishable from the nonCPC comparison group on any outcome (see the appendix, "Estimated Models for Years of Program Participation").

These findings also can be used to estimate the effect of extensive program participation. Six years of participation yielded effects sizes of .52 (11.4 points), .47 (8.6 points), and .50 (5.2 points) for reading achievement, math achievement, and life-skills competence. Six years also was associated with an 80 percent reduction in grade retention (34.7 to 6.9 percent), and .4 fewer years of special education. For five years of participation, effects sizes were respectively .33 (7.2 points), .39 (7.1 points), and .35 (3.7 points), and 51 percent reduction in grade retention (34.7 percent to 16.9 percent), and .6 fewer years in special education. Interestingly, when years of preschool/kindergarten and years of primary grade intervention are included, both contribute significantly to the total impact of the program. This impact of duration is similar to results in third and fifth grades (Reynolds 1994).

Question 3: Does Participation in Extended Intervention Lead to Better School Performance than Less Extensive Intervention?

This question considers the influence of primary-grade intervention above and beyond the influence of preschool and kindergarten intervention. Thus, it addresses the potential value of extending intervention into the primary grades. The analysis of this question included only children who participated in the CPC program in at least preschool and kindergarten and were active in the study in eighth grade. Table 8 reports the performance of children who participated for the maximum of six years compared to those whose participation ended in kindergarten. In addition to the demographic factors, both reading and math achievement scores at the end of kindergarten were included as covariates.

Findings indicate that extended intervention from preschool to third grade was significantly associated with all outcomes except special education placement. The differences in reading and math

TABLE 8

Eighth Grade Adjusted Means for Extended Program Participation and Less Extended Participation

Group	Reading Achievement	Math Achievement	Life Skills	% Retained	Years in Special Education
Pre-K + K + Prim-3	154.9	154.3	44.6	6.9	.35
Pre-K + K only	147.7	142.7	40.6	32.1	.61
Mean Diff.	7.2**	5.2**	4.0**	-18.6***	-.26
Effect size	.33	.29	.39	—	.19
Sample size	649	649	650	654	654

Note: Reading and math achievement are standard scores on the Iowa Tests of Basic Skills (ITBS). Sample size includes all children with extended intervention not just the two groups shown.

*p < .05
**p < .01
***p < .001

achievement equal six and four months of performance, respectively. Especially large were the differences in grade retention between groups. In the extended intervention group, 6.9 percent were retained compared to 32.6 for the comparison group, a 79 percent reduction.[5] It is possible that part of the reduction in grade retention could be due to school-specific factors.

Also investigated were the effects of extended intervention up to second grade rather than third grade (four or five years of participation). Although children with extended participation through second grade had consistently better performance across outcomes, only the difference for special education placement was significant. The extended intervention group spent .44 fewer years in special education than the preschool and kindergarten group.

These findings are consistent with a seventh-grade analysis by Temple and Reynolds (1995), in which 426 children who participated from preschool were compared with 191 children whose participation with the CPC Program stopped after kindergarten. After controlling for demographic variables, kindergarten achievement, achievement growth, attrition, and later school mobility, seemingly unrelated regression results indicated that children participating up to second or third grade scored 5 points higher in reading and 6 points higher in math achievement. However, children who participated up to third grade had, on average, the highest achievement.

Timing of Intervention. These findings support the positive influence of duration of program participation controlling for the timing of program entry. Does the timing of entry into intervention influence school performance controlling for duration of participation? To address this question, the performance of 158 children who participated in the program for four years beginning in preschool was compared to 60 children who participated for four years beginning in kindergarten. School performance

[5]Analyses including children who participated in the program for either five or six years up to third grade indicated significant mean differences (in favor of the program group) of 4.7 for reading achievement, 4.1 for math achievement, and 2.6 for life-skills competence. Participation also was significantly associated with a 63 percent reduction in grade retention, and .3 fewer years in special education.

consistently favored the early entry group but differences were not statistically significant. The effect size for reading achievement was .21 standard deviations (4 standard-score points), however. These findings are different than those at the two-year follow-up (Reynolds 1994). Of course, results are limited to children with four years of participation. For example, Figure 2 clearly shows the positive influence of early and extensive participation in the program.

Question 4: Which Factors Mediate the Effects of Participation?

A major question raised by the findings reported above is, how do these observed positive effects of the CPC program come about? In other words, what are the pathways through which long-term effects are achieved? These pathways not only identify additional targets of postprogram intervention but provide a rationale for explaining observed program effects, which is critical for quasi-experimental findings. If the estimated program effects are explained by processes predicted by the program theory, causal inference is enhanced. This approach is called confirmatory program evaluation (Reynolds 1995b).

Figure 3 presents the findings of a latent-variable structural model of intervention effects up to sixth grade for a subsample of CPC children. The coefficients are standardized regression coefficients. This confirmatory model includes 5 factors as mediators of effects of preschool intervention: (a) cognitive readiness at kindergarten entry, (b) teacher ratings of school adjustment, (c) parent involvement in school, (d) school mobility (number of school moves), and (e) grade retention. Parent involvement was measured by parent ratings of parent involvement in school and teacher ratings of parent involvement in school up to fourth grade. Sixth grade achievement included both reading and math achievement test scores (see Reynolds, Mavrogenes, Bezruczko, and Hagemann 1996 for details). The model was estimated for 360 children who participated in the six CPCs that provided services to third grade (240 participated in preschool and 120 did not). For simplicity, paths involving participation in the primary-grade component are not shown.

Figure 3 not available for the online web version of this paper. Print versions of the figures are available from the author.

As shown, this confirmatory model supports both the cognitive-advantage and family-support hypotheses discussed in the introduction. One primary path of influence to grade 6 school achievement was through cognitive readiness at kindergarten entry (b = .140 or .39 x .36). Preschool participants start school more ready to learn and this greater readiness is reflected in grade 6 school achievement. Another primary path of influence on grade 6 school achievement was through parent involvement in school (b = .116 or .40 x .29). Preschool participation was positively associated with parental school involvement, which in turn significantly influenced later school achievement. However, as with the cognitive advantage hypothesis, the family support hypothesis appears to be an incomplete explanation of preschool effectiveness. The model fit better than several alternative models and suggests that the pathways of influence of early childhood intervention are complex and involve several alterable variables. Grade retention and school mobility appear to inhibit the transmission of preschool effects. They also negatively influence school achievement in sixth grade. Although not shown, participation in the primary-grade portion of the CPCs was associated with higher teacher ratings of school adjustment (b = .10) and parent involvement in school (b = .33).

DISCUSSION

The Child-Parent Center Program was designed to promote children's school success by providing comprehensive educational and family support services spanning two important periods of development, the preschool years and the transition to formal schooling in the primary grades. Tracing the development of the 1989 graduates of the program up to age 14, findings indicate that large-scale programs can be successful in promoting the school success of economically disadvantaged children. Specifically, I found that (a) any participation in the program was significantly associated with school performance up to eighth grade, (b) duration of participation was significantly associated with school performance, especially for children who participated for five or six years, and (c) participation in

extended childhood intervention to second and third grade yielded significantly better school performance than participation ending in kindergarten. Finally, longer-term effects of the program can be explained by cognitive-advantage and family-support hypotheses, both of which are theoretically linked to the program. The pathways of effects are complex, however.

Overall, findings in the Chicago Longitudinal Study demonstrate that established large-scale early childhood programs can be successful for economically disadvantaged children. They can promote positive school adjustment beyond second and third grade as has been shown for other programs (Consortium for Longitudinal Studies 1983). These findings mollify the growing pessimism about the longer-term effects of early intervention. Unique to the Child-Parent Centers, however, is the integration of preschool, kindergarten, and primary-grade services. Participation in early childhood intervention also has indirect effects (see Figure 2), and they often are unmeasured at the consequence of underestimating the total impact of the program.

A second conclusion is that duration of intervention exposure is significantly associated with all indicators of school performance. Participation in primary-grade intervention positively influenced performance above and beyond earlier intervention even after taking into account kindergarten achievement in reading and math. Longer-lasting interventions, which provide an array of services such as smaller class sizes, teacher training, and parent involvement activities, allow children greater opportunities to develop scholastic and social skills necessary for sustained effects. Studies by Alexander and Entwisle (1988) and Reynolds (1989, 1991) support the value of intervening school-based and family support factors in promoting successful adjustment to the primary grades. Of course, the positive influence of extensive participation also indicates that early entry into the program at age 3 contributes to later school performance. Thus, the findings of similar school performance of four-year participants who began in preschool and four-year participants who began in kindergarten should be interpreted with caution.

How do the longer-term effects of the program come about? Two explanations are apparent. Both are consistent with the program theory. One is that program participation enhances children's early cognitive and language development so that they are more likely to begin school ready to learn and this greater readiness provides advantages in adjusting to school. A second explanation for longer-term program effects is that the intervention encourages parent involvement in school and in children's education such that when the intervention ends parents are more likely to continue to provide the nurturance necessary to maintain gains made in the program. While cognitive functioning at school entry and parent involvement foster longer-term program effectiveness, two other factors appear to inhibit the transmission of long-term gains: (i) frequent school mobility and (ii) grade retention. Avoidance of these two life events after the end of the intervention helps maintain learning gains. Continued follow-up of these pathways and others will be necessary, as will analyses of the total study sample of children.

Although the quasi-experimental design of the study means that findings should be interpreted with caution, several strengths of the study substantially enhance the validity of findings. First, the internal validity of findings has been investigated extensively through analysis of attrition, selection bias, alternative comparison groups, multiple outcome variables, and consideration of duration of treatment participation. Findings have been largely consistent across these analytic approaches. Such in-depth sensitivity analyses are rare in intervention research. A second strength of the study is the prospective longitudinal design and comprehensive data collection of the project, which enables investigation of year-to-year changes in outcomes and comparisons among outcomes. For example, program effects are stronger in the scholastic domain rather than in the social domain. This is consistent with the theory of the program. Without extensive ongoing data collection this distinction would not have been possible. A third strength of the study is that pathways of effects of the program have been investigated to explain how the program could produce long-term effects. Findings of alternative models specifications indicate that the identified pathways involving cognitive development and parent involvement are plausible. This

finding provides confirmatory evidence of the efficacy of the program. Finally, the investigation of a large-scale established program and relatively large sample increases the generalizability of findings to typical programs, and there is ample statistical power to detect difference across groups and among subgroups in the sample. Very few studies of early interventions have these attributes.

RECOMMENDATIONS

Follow-up data collection into high school is currently being undertaken to further investigate longitudinal relationships between program participation and scholastic adjustment. Relationships with juvenile delinquency and high school completion also will be pursued. Based on the available findings, however, three recommendations are warranted.

First, the Child-Parent Center Program should be fully funded and implemented in target schools. Unfortunately, in the past few years a number of schools have decided not to continue funding the primary-grade portion of the program, which comes from Title I funding from the state of Illinois. Local schools have much more latitude in the disbursement of state funds than of federal Title I funding. Although schools have the authority to make their own decisions and all worthy programs cannot be implemented, funding decisions should favor programs that have demonstrated effects.

The reason that extended early childhood programs may be more effective is not just because they are longer in duration. They encourage stability in school and home learning environments and they occur at a very important time in children's development—the transition to formal schooling. School reform initiatives should take these issues into account.

A second recommendation is that parent involvement in the program should be enhanced. Although parent involvement in the program is a primary source of effects, previous analysis in the study indicate that parent involvement varies considerably across sites. Active involvement of parents in the full array of activities sponsored by the center is critical to the program's continued success. Since parent

involvement in school appears to be a primary pathway for promoting long-term success, program and schoolwide efforts to involve parents in their children's education will benefit not only the early childhood interventions but family and children's development generally.

Finally, extended intervention programs like the Child-Parent Centers should be implemented on a larger scale. Program implementation has been exclusive to Chicago. Replication of the program in other schools and cities would be valuable in determining its impact within other contexts. One impediment to program expansion is that the Child-Parent Center program model is comprehensive and requires that preschool programs be physically as well as conceptually connected to public elementary schools in a school-within-school framework. Thus, a strong commitment to integrating preschool and school-age programs is needed. The long-term benefits of implementing such an approach, however, are worth the investment.

APPENDIX

Estimated Models for Years of Program Participation

Variable	B	SE B	Beta	T	Sig T
GRADE 8 READING ACHIEVEMENT					
NMISS	-1.733585	.436085	-.112687	-3.975	.0001
4YEARS	2.855262	2.005617	.046566	1.424	.1548
INCOME	-.038522	.066564	-.016328	-.579	.5629
SEX	8.098920	1.252041	.179745	6.469	.0000
LUNCH	-7.794609	2.016571	-.108246	-3.865	.0001
EKAGE	.043614	.173917	.006993	.251	.8020
6YEARS	11.402169	2.817967	.122790	4.046	.0001
BLACK	-11.043076	3.033231	-.101986	-3.641	.0003
PARED	7.708264	1.528790	.142589	5.042	.0000
NCHILD	-.416409	.442430	-.026693	-.941	.3468
1&2YEARS	-1.021726	2.064016	-.016052	-.495	.6207
3YEARS	2.332447	1.910099	.040752	1.221	.2223
5YEARS	7.288249	1.857700	.132620	3.923	.0001
(Constant)	153.487710	12.502456		12.277	.0000
GRADE 8 MATH ACHIEVEMENT					
NMISS	-1.537374	.367167	-.119641	-4.187	.0000
FOREYR	3.453337	1.688653	.067426	2.045	.0411
INCOME	-.066814	.056044	-.033904	-1.192	.2334
SEX	5.585371	1.054171	.148407	5.298	.0000
LUNCH	-6.466983	1.697875	-.107520	-3.809	.0001
EKAGE	-.036522	.146431	-.007011	-.249	.8031
SIXYR	8.486477	2.372620	.109414	3.577	.0004
BLACK	-8.403096	2.553864	-.092910	-3.290	.0010
PARED	5.306775	1.287183	.117525	4.123	.0000
NCHILD	-.278549	.372509	-.021377	-.748	.4548
ONTWYR	-.508640	1.737822	-.009567	-.293	.7698
THREYR	1.434830	1.608230	.030013	.892	.3725
FIVEYR	7.014522	1.564112	.152811	4.485	.0000
(Constant)	161.457141	10.526588		15.338	.0000

(table continues)

APPENDIX, continued

Variable	B	SE B	Beta	T	Sig T
LIFE-SKILLS COMPETENCE					
NMISS	-.508210	.213566	-.068811	-2.380	.0175
FOREYR	2.886577	.982218	.098059	2.939	.0034
INCOME	-.032484	.032598	-.028679	-.997	.3192
SEX	2.094322	.613167	.096819	3.416	.0007
LUNCH	-2.493031	.987582	-.072116	-2.524	.0117
EKAGE	-.017051	.085173	-.005695	-.200	.8414
SIXYR	6.318683	1.380053	.141738	4.579	.0000
BLACK	-5.644213	1.485475	-.108577	-3.800	.0002
PARED	2.709026	.748700	.104383	3.618	.0003
NCHILD	-.497521	.216673	-.066430	-2.296	.0218
ONTWYR	.525036	1.010818	.017181	.519	.6036
THREYR	2.109270	.935439	.076763	2.255	.0243
FIVEYR	4.553271	.909778	.172581	5.005	.0000
(Constant)	47.626660	6.122879		7.778	.0000
CUMULATIVE GRADE RETENTION					
NMISS	.026528	.008891	.085902	2.984	.0029
FOREYR	-.102574	.040889	-.083335	-2.509	.0123
INCOME	-4.23971E-04	.001357	-.008952	-.312	.7548
SEX	-.164111	.025526	-.181444	-6.429	.0000
LUNCH	.107759	.041112	.074549	2.621	.0089
EKAGE	-.010030	.003546	-.080121	-2.829	.0048
SIXYR	-.278318	.057450	-.149310	-4.844	.0000
BLACK	.088270	.061839	.040610	1.427	.1537
PARED	-.081149	.031168	-.074780	-2.604	.0093
NCHILD	.005651	.009020	.018047	.627	.5311
ONTWYR	-.001794	.042079	-.001404	-.043	.9660
THREYR	-.092767	.038941	-.080742	-2.382	.0174
FIVEYR	-.169273	.037873	-.153442	-4.469	.0000
(Constant)	.943451	.254891		3.701	.0002

(table continues)

APPENDIX, continued

Variable	B	SE B	Beta	T	Sig T
YEARS IN SPECIAL EDUCATION					
NMISS	.019944	.034074	.017285	.585	.5584
FOREYR	-.297026	.156710	-.064587	-1.895	.0583
INCOME	.005743	.005201	.032454	1.104	.2697
SEX	-.498821	.097829	-.147606	-5.099	.0000
LUNCH	.139787	.157566	.025883	.887	.3752
EKAGE	.012290	.013589	.026275	.904	.3660
SIXYR	-.436699	.220183	-.062703	-1.983	.0476
BLACK	.187310	.237003	.023064	.790	.4295
PARED	-.247930	.119453	-.061149	-2.076	.0382
NCHILD	-.005096	.034569	-.004355	-.147	.8828
ONTWYR	.201762	.161273	.042262	1.251	.2112
THREYR	-.251775	.149247	-.058651	-1.687	.0919
FIVEYR	-.546823	.145152	-.132667	-3.767	.0002
(Constant)	-.214806	.976892		-.220	.8260

Note: NMISS = number of missing family background variables.

References

Alexander, K. L., and D. R. Entwisle. 1988. "Achievement in the First Two Years of School: Patterns and Processes." *Monographs of the Society for Research in Child Development* 53 (2, Serial No. 218).

Barnett, W. S. 1992. "Benefits of Compensatory Preschool Education." *Journal of Human Resources* 27: 279–312.

Berrueta-Clement, J. R., L. J. Schweinhart, W. S. Barnett, A. S. Epstein, and D. P. Weikart. 1984. *Changed Lives: The Effects of the Perry Preschool Program on Youths through Age 19.* Ypsilanti, MI: High/Scope.

Campbell, F. A., and C. T. Ramey. 1994. "Effects of Early Intervention on Intellectual and Academic Achievement: A Follow-Up Study of Children from Low-Income Families." *Child Development* 65: 684–698.

Campbell, F. A., and C. T. Ramey. 1995. "Cognitive and School Outcomes for High-Risk African-American Students at Middle Adolescence: Positive Effects of Early Intervention." *American Educational Research Journal* 32: 743–772.

Chafel, J. A. 1992. "Funding Head Start: What Are the Issues?" *American Journal of Orthopsychiatry* 62: 9–21.

Chicago Public Schools. 1986. *Chapter 2 All-Day Kindergarten Program Final Evaluation Report: Fiscal 1985.* Chicago: Department of Research and Evaluation.

Chicago Public Schools. 1987. *Chapter 2 All-Day Kindergarten Program Final Evaluation Report: Fiscal 1986.* Chicago: Department of Research and Evaluation.

Chicago Public Schools. 1992. "ECIA Chapter I Application: Fiscal 1991." Chicago: Chicago Public Schools.

Cohen, J., and P. Cohen. 1983. *Applied Multiple Correlation/regression Analysis for the Behavioral Sciences.* Hillsdale, NJ: Lawrence Erlbaum.

Conrad, K. J., and M. J. Eash. 1983. "Measuring Implementation and Multiple Outcomes in a Child-Parent Center Compensatory Education Program." *American Educational Research Journal* 20: 221–236.

Consortium for Longitudinal Studies. 1983. *As the Twig Is Bent.* Hillsdale, NJ: Lawrence Erlbaum.

Crum, D. 1993. "A Summary of the Empirical Studies of the Long-Term Effects of Head Start." Unpublished manuscript. Pennsylvania State University.

Fuerst, J. S., and D. Fuerst. 1993. "Chicago Experience with an Early Childhood Program: The Special Case of the Child-Parent Center Program." *Urban Education* 28: 69–96.

Haskins, R. 1989. “Beyond Metaphor: The Efficacy of Early Childhood Education.” *American Psychologist* 44: 274–282.

Madden, N. A., R. E. Slavin, N. L. Karweit, L. J. Dolan, and B. A. Wasik. 1993. “Success for All: Longitudinal Effects of a Restructuring Program for Inner-city Elementary Schools.” *American Educational Research Journal* 30: 123–148.

McKey, R. H., L. Condelli, H. Ganson, B. J. Barrett, C. McConkey, and M. C. Plantz. 1985. “The Impact of Head Start on Children, Families, and Communities.” DHHS Publication No. OHDS 85-31193. Washington, D.C.: U. S. Government Printing Office.

National Education Goals Panel. 1994. *The National Education Goals Report: Building a Nation of Learners.* Washington, D.C.: U. S. Government Printing Office.

National Head Start Association. 1990. *Head Start: The Nation’s Pride, a Nation’s Challenge.* Alexandria, VA: National Head Start Association.

Natriello, G., E. L. McDill, and A. M. Pallas. 1990. *Schooling Disadvantaged Children: Racing against Catastrophe*. New York: Teachers College Press.

Ramey, S. L., and C. T. Ramey. 1992. “Early Educational intervention with Disadvantaged Children—to What Effect?” *Applied and Preventive Psychology* 1: 131–40.

Reynolds, A. J. 1989. “A Structural Model of First-grade Outcomes for an Urban, Low Socioeconomic Status, Minority Population.” *Journal of Educational Psychology* 81: 594–603.

Reynolds, A. J. 1991. “Early Schooling of Children at Risk.” *American Educational Research Journal* 28: 392–422.

Reynolds, A. J. 1994. “Effects of a Preschool plus Follow-on Intervention for Children at Risk.” Developmental Psychology 30.

Reynolds, A. J. 1995a. “One Year of Preschool Intervention or Two: Does It Matter?” *Early Childhood Research Quarterly* 10: 1–31.

Reynolds, A. J. 1995b. “Confirmatory Program Evaluation: An Introduction and Application to Poverty Research.” Paper presented at the Institute for Research on Poverty, University of Wisconsin, Madison, WI.

Reynolds, A. J., and N. Bezruczko. 1989. “Assessing the Construct Validity of a Life-Skills Competency Test.” *Educational and Psychological Measurement* 49: 183–193.

Reynolds, A. J., and N. Bezruczko. 1993. “School Adjustment of Children at Risk through Fourth Grade.” *Merrill-Palmer Quarterly* 39: 457–480.

Reynolds, A. J., N. Bezruczko, N. A. Mavrogenes, and M. Hagemann. 1996. *Chicago Longitudinal Study of Children in the Chicago Public Schools: User’s Guide Version 4.* Madison and Chicago: University of Wisconsin and Chicago Public Schools.

Reynolds, A. J., N. A. Mavrogenes, N. Bezruczko, and M. Hagemann. 1996. "Cognitive and Family-support Mediators of Preschool Effectiveness: A Confirmatory Analysis." *Child Development* 67: 1119–1140.

Reynolds, A. J., M. Mehana, and J. Temple. 1995. "Does Preschool Intervention Affect Children's Perceived Competence?" *Journal of Applied Developmental Psychology* 16: 211–230.

Reynolds, A. J., and J. A. Temple. 1995. "Quasi-experimental Estimates of the Effects of a Preschool Intervention: Psychometric and Econometric Comparisons." *Evaluation Review* 19: 347–373.

Rovner, J. 1990. "Head Start Is One Program Everyone Wants to Help." *Congressional Quarterly* 48 (16): 1191–1195.

Schweinhart, L. J., H. V. Barnes, and D. P. Weikart. 1993. *Significant Benefits: The High/Scope Perry Preschool Study through Age 27.* Ypsilanti, MI: High/Scope.

Schweinhart, L. J., and D. P. Weikart. 1988. "The High/Scope Perry Preschool Program." In *Fourteen Ounces of Prevention: A Casebook for Practitioners*, ed. R. H. Price, E. L. Cowen, R. P. Lorion, and J. Ramos-McKay, pp. 53–65. Washington, D.C.: American Psychological Association.

Seitz, V. 1990. "Intervention Programs for Impoverished Children: A Comparison of Educational and Family Support Models." *Annals of Child Development* 7: 73–103.

Temple, J. A., and A. J. Reynolds. 1995. "Extending Compensatory Intervention into the Primary Grades: Evidence from the Chicago Longitudinal Study." Paper presented at the annual meeting of the Association Economic Association, Washington, D.C.

Wachs, T. D., and G. E. Gruen. 1982. *Early Experience and Human Development.* New York: Plenum Press.

White, K. R. 1985. "Efficacy of Early Intervention." *Journal of Special Education* 19: 401–416.

Woodhead, M. 1988. "When Psychology Informs Public Policy: The Case of Early Childhood Intervention." *American Psychologist* 43: 443–454.

Yoshikawa, H. 1994. "Prevention as Cumulative Protection: Effects of Early Family Support and Education on Chronic Delinquency and its Risks." *Psychological Bulletin* 115: 27–54.

Zigler, E., and S. Muenchow. 1992. *Head Start: The Inside Story of America's Most Successful Educational Experiment.* New York: Basic Books.

Zigler, E., and S. Styfco, eds. 1993. *Head Start and Beyond: A National Plan for Extended Childhood Intervention.* New Haven: Yale University Press.