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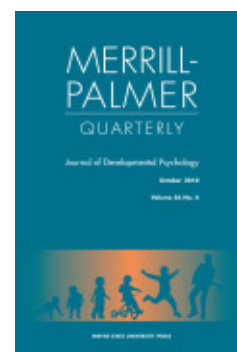
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Early Learning and School Readiness: Can Early Intervention Make a Difference?

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Children's experiences prior to kindergarten entry are correlated with degree of cognitive development and school readiness as measured by standardized assessments of cognitive and linguistic performance. Children from economically poor and undereducated families are at elevated risk for lack of school readiness due to less knowledge and skill. This article reviews evidence from randomized controlled trials (RCTs) that were designed to test the hypothesis that preschool education, with an emphasis on seven particular classes of experiences, could be efficacious in improving readiness for school and subsequent academic achievement in reading and mathematics. Results indicate that the cumulative developmental toll that is measured reliably in high-risk samples of children beginning in the second year of life can be substantially reduced through a high-quality preschool program. This positive effect has been replicated in nine additional trials using RCT methodology. Additionally, long-term follow-up of the original study participants indicates not only improved performance in reading and mathematics in elementary and secondary school but also a reduction in special education placement and grade retention, among other practical benefits. Results are discussed with respect to public policy recommendations and suggestions for future research.

The United States continues to evolve into a society that requires all of its adult members to be literate, proficient in basic math, and facile with means of acquiring and using new knowledge. As automation of routine jobs increases and as globalization of business results in the transfer of manufacturing and service jobs to less expensive

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foreign labor markets, the pressures increase to become an even more academically accomplished society. Thus, the educational bar in K-12 and college education is constantly being raised. As the educational expectations and the bar for minimal competence are raised, a basic problem becomes more and more apparent. The experiences of children from different social classes lead to marked differences in skills and knowledge as measured by standardized tests administered when children enter kindergarten. These social-class discrepancies are of no small magnitude and are strongly related to subsequent school performance as indexed by standardized measures of academic achievement as well as disproportionate rates of grade retention and special education placement (Donovan & Cross, 2002). Although this social class issue is frequently construed as a practical educational issue, it is also directly germane to more fundamental issues of human development, including the extent of human cognitive malleability and the relative importance of various causal factors which regulate that malleability.

It is an ominous omen for American society that over the past two decades approximately one-third of children entering kindergarten are consistently judged by their kindergarten teachers as not ready for typical kindergarten-level work (Carnegie Task Force, 1994). Since the 1960s, the authors have been involved, along with a large number of colleagues from many life-science disciplines, in trying various early intervention strategies to understand better the causal factors involved in the developmental discrepancies related to social class, with the ultimate aim of improving the intellectual performance and basic social competence of young children from high-risk family backgrounds. This article is a brief summary of that work and its historical and scientific contexts.

School Readiness and School Achievement

School readiness and school achievement are at the forefront of our country's domestic social policy concerns. How can we help all of America's children to truly succeed in school and in life? A well-educated citizenry is vital to our country's future as a democracy and as a productive and economically strong nation. Unprecedented numbers of children start public kindergarten with major delays in language and basic academic skills. Children with these significant delays attend schools in every state; they are *not* concentrated in only a few large urban school districts or in desperately poor rural districts. Waiting until these children "fail" in school and then providing remedial, pull-out, or compensatory programs or requiring them to repeat

grades typically does *not* sufficiently help these children to catch up and then achieve at grade level. Instead, the scientific evidence affirms that children who do not have positive early transitions to school—that is, those children who have early failure experiences in school—are those most likely to become inattentive, disruptive, or withdrawn. Later, these same students are the most likely to drop out of school early; to engage in irresponsible, dangerous, and illegal behaviors; to become teen parents; and to depend on welfare and numerous public assistance programs for survival (Shonkoff & Phillips, 2000). What can be done to end this predictable decline?

There is compelling scientific evidence that this negative developmental cascade *can* be prevented. The prevention of school failure and the promotion of children's cognitive and linguistic development cannot wait until kindergarten or until children show signs of developmental delay. Rather, the commitment to improving K-12 academic achievement must begin by providing children *in the pre-K years* with a rich array of effective learning opportunities.

Recent scientific advances in the fields of child development science, neurobiology, and early childhood education affirm that the early years are a time of rapid growth and development. Scientists are mapping, in increasingly greater detail, this remarkable period of life. Collectively, these scientific findings indicate that learning and brain development are truly interdependent and that what happens early in development has lasting and important consequences.

Essential Experiences in the Early Learning Years

What are the crucial experiences needed in the early years of life? Does early caretaking or experience really affect brain development? Are these effects important or lasting? In recent scientific articles (e.g., Ramey & Ramey, 1998a) and books for parents (e.g., Ramey & Ramey, 1999a, 1999b), we have summarized a vast body of scientific evidence in terms of seven types of experiences that are essential to ensure normal brain and behavioral development and school readiness:

1. Encourage exploration.
2. Mentor in basic skills.
3. Celebrate developmental advances.
4. Rehearse and extend new skills.
5. Protect from inappropriate disapproval, teasing, and punishment.
6. Communicate richly and responsively.
7. Guide and limit behavior. (Ramey & Ramey, 1999b, p. 145)

Right from birth, babies are actively learning throughout the day. This learning occurs through the types, amounts, and predictability of visual, auditory, and social-emotional experiences the baby has with parents and other caregivers. These seven essential types of experiences are backed by extensive scientific evidence and causally linked to many aspects of brain functioning and child development. These experiences primarily reflect transactions that parents and other caring individuals can provide for children in all cultures; they do not require money or any special toys or equipment, but they do involve time, skill, and active commitment.

There is a positive quantitative relationship between receiving more (or less) of these seven essentials and children's development. Figure 1, from the work of Huttenlocher, Harght, Bruk, Seltzer, and Lyons (1991), illustrates an example of this quantitative relationship: during the first 24 months of life, children's acquisition of language is highly associated with their mothers' speech to them. By 2 years of age, children whose mothers speak to them frequently and responsively have vocabularies that are 8 times greater than those of children whose mothers speak less frequently. This strong relationship between the amount of parental language stimulation—as well as active parental teaching—and children's language and cognitive development has been documented in scores of studies, including the extensive naturalistic observation work by Hart and Risley (1995). But the most compelling findings are those *experimentally produced* results that demonstrate the significant benefits of providing enriched learning opportunities to those children who do *not* receive these on a regular basis in their homes (Ramey, Yeates, & Short, 1984). When given the right types and amounts of language and cognitive experiences, particularly within a warm and responsive social context, high-risk children show gains in their intellectual and linguistic competence.

Learning to read is vital for school success and relates strongly to children's early language development. Children who are in a rich and highly interactive language environment acquire strong oral-language skills—the ability to understand increasingly complex spoken language and to express themselves through the use of increasingly specific words in conversational discourse. In addition to oral-language comprehension, phonological awareness is important. In the preschool years, children can learn much about the world of reading: that words are made up of a set of distinct sounds and that the printed word corresponds to the spoken word in orderly ways; that letters and combinations of letters relate to sounds and meaning, which in turn help them decipher words on a page; that words combine into sentences and have sequences that are important to telling a story or conveying useful information. Even

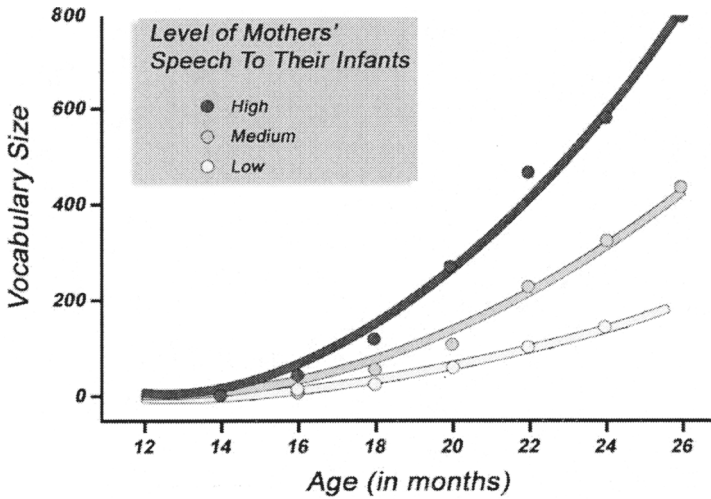


Figure 1. Effects of mothers' speech on infant vocabulary. (From "Early Vocabulary Growth: Relation to Language Input and Gender," by J. Huttenlocher, W. Harght, A. Bruk, M. Seltzer, and T. Lyons, 1991, *Developmental Psychology*, 27, 236–248. Reprinted with permission.)

very young children can acquire letter name knowledge and many other basic concepts about print. The children who have this set of diverse language and preliteracy skills are among those who are best prepared to receive and benefit from the right types of formal reading instruction in elementary school.

The Cumulative Toll of Limited Learning Opportunities

There is an undeniable cumulative toll of limited learning opportunities and low expectations for children from high-risk home environments. The prototypical comparative course of development for children who do and those who do not receive positive learning experiences in the first 5 years of life is shown in Figure 2. Extrapolating from several studies that we and our colleagues have conducted, this figure illustrates that high-risk children without a solid pre-K educational foundation (illustrated by the gray line) are likely to start kindergarten approximately 2 (or more) years behind their agemates who are reared in more typical environments. Typically, those children who show developmental delays by kindergarten had developed at normal rates during the first year of life but evidenced slower rates of development beginning in the second year. (Of course, the difference in terms of developmental age or developmental competence is even greater when children from high-risk environments are compared with chil-

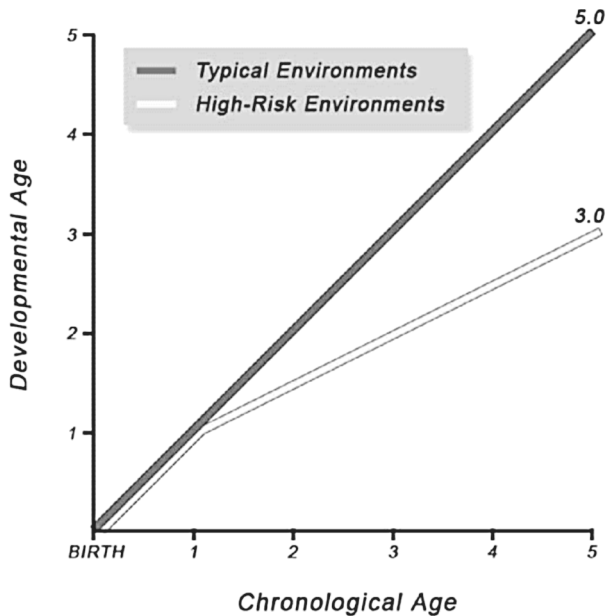


Figure 2. The impact of early environments on children's developmental competence.

dren from learning-enriched environments.) Delays of this magnitude constitute a serious educational challenge for classroom teachers and school districts, as well as for the children themselves.

Studies have confirmed that when children who are developmentally delayed enter *good* schools, they do learn and benefit—at rates which indicate that their learning is not truly impaired. Figure 3 shows that in 9 months of school, the children advance about 9 months developmentally in their cognitive and language skills. Yet this rate of learning is not sufficient to compensate for their entry-level delays or to allow the children to fully “catch up.” That is, 5-year-old children whose cognitive and language skills are like those of a 3-year-old are “ready to learn” at their own level and show progress at a normal rate. A first-rate kindergarten educational environment can definitely promote new learning. However, these delayed children are unlikely to be able to advance a full 33 developmental months in only 9 calendar months—that is, an amount sufficient to close the achievement gap. Just as importantly, scientific studies have demonstrated that during the 3 summer months, children from homes that do not actively promote learning fail to show progress in their academic or language skills, whereas children from families that provide ongoing cognitive supports progress another 3 developmental months (Entwisle, 1995).

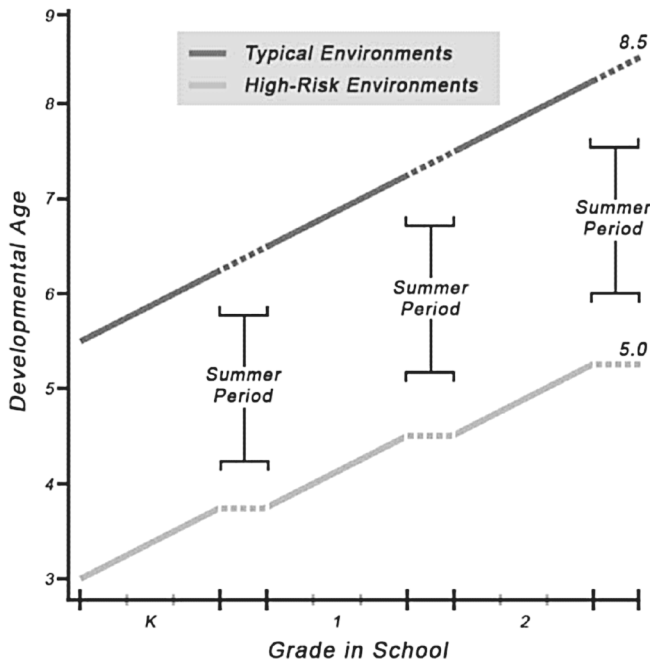


Figure 3. The importance of good schools and summer programs.

This difference in children's learning over the summer months serves to further increase the academic achievement gap between disadvantaged and advantaged children—even when the former are in highly supportive school programs during the academic year. As depicted here, by the end of second grade, children from high-risk environments who do not receive strong summer learning opportunities—in spite of their 3 years of a strong school-based program—will be even further behind their classmates from more advantaged homes. Similarly, there is increasing evidence that what happens in the extended day—that is, before and after school (and probably over the weekend days as well) makes a difference in children's academic achievement.

As is readily apparent, children's learning is not restricted solely to their formal schooling hours. Children's achievement in the school years, just as in the first 5 years of life, is the result of all of their learning opportunities—at home, in formal programs, on the playground, in the community. The fact is, it is the totality of a child's experience that lays the foundation for a lifetime of greater or lesser competency. This means that schools are vitally important, but our current schools *alone* cannot close the achievement gap. Rather, we need strategic investments in those programs and community supports which will ensure

that children's developmental needs are met in a timely, consistent, and responsive way—so that they will have those “daily essentials” that undergird their becoming increasingly caring, cooperative, creative, and contributing young citizens.

In the next section we briefly describe our work that has been aimed at preventing school failure by promoting school readiness.

The Abecedarian Study

The first study we began is known as the Abecedarian (pronounced “Ab'-a-sa-dare-ee-an,” similar to ABCDarian) or ABC Study. The word *Abecedarian* comes from Latin and means “one who learns the basics, such as the alphabet.” In the early 1970s we launched the Abecedarian Study of 111 children in North Carolina. All of these children had families that were extremely challenged in terms of very low income (below 50% of the federal poverty line), very low levels of maternal education (about 10 years of education), and low maternal intellectual attainment (with an average IQ near 80); most parents were single (about 75%) and unemployed. The children were healthy, full-term, normal birth weight infants. In this study we sought to answer the following question: Can the cumulative developmental toll experienced by socially defined high-risk children be prevented or reduced significantly by providing systematic, high-quality early childhood education that emphasized the seven essentials from birth through kindergarten entry?

The Abecedarian Project is a randomized, controlled trial that tests the efficacy of early childhood education for high-risk children and their families. The design of the study, illustrated in Figure 4, focused on the added value of a high-quality, supportive *educational* program for young children. Accordingly, children in both the treatment group and the control group were given adequate nutrition in the form of free unlimited supplies of formula (no mother chose to breast-feed); were provided with social services for the family and referrals as needed (such as for housing, job training, and mental health and substance abuse problems); and were given free or reduced-cost medical care throughout the first 5 years of life (consistent with the highest levels of professionally recommended pediatric care). Thus, the control-group children and their families were not “untreated,” because their basic nutrition, health, and social service needs were addressed systematically for the first 5 years of life. As shown in Figure 4, the children in the treatment group were enrolled in a specially created early childhood center by the time they were 6 months of age. This preschool program was a full-day program, 5 days per week and 50 weeks per year; and children attended until they entered public kindergarten. The spe-

Treatment Group	Control Group
<ul style="list-style-type: none"> • Adequate nutrition • Supportive social services • Free primary health care • Preschool treatment: Intensive (full day, 5 days/week, 50 weeks/year, 5 years) • "Learningames" Curriculum Cognitive / Fine Motor Social / Self Motor Language Individualized pace 	<ul style="list-style-type: none"> • Adequate nutrition • Supportive social services • Low-cost or free primary health care

Figure 4. Abecedarian preschool program.

cially developed curriculum, known first as Learningames (Sparling & Lewis, 1979, 1984) and later as Partners for Learning (Sparling, Lewis, & Ramey, 1995), was informed by developmental theory and the burgeoning scientific evidence about how infants and toddlers learn. The Learningames curriculum had over 500 specified activities for teachers to provide for children in the areas of cognition, fine motor development, social and self development, motor development, and language. The teachers were skilled in individualizing this program for each child, so that children were continuously challenged to progress to the next levels—that is, they were not placed in a rigid group curriculum that might have been too advanced or too simple for them. In addition, a special language curriculum was used that emphasized conversational skills and prereading activities (McGinness & Ramey, 1981; Ramey, McGinness, Cross, Collier, & Barrie-Blackley, 1981).

The Preschool Results

We measured many aspects of children's growth and development during the preschool years. In this article we will concentrate on the cognitive outcomes. To address ethical concerns about the developmental progress of children, we should note that referrals were made to development clinics if treatment-group *or* control-group children dropped below predetermined levels of performance on two successive measurement occasions. We believe that this feature plus the other child and family services render the treatment- versus control-group comparisons a more conservative test of the effects of the treatment program than otherwise would have been the case.

Figure 5 (Ramey et al., 2000) shows the results of individual cognitive assessments in which a score of 100 represents the national aver-

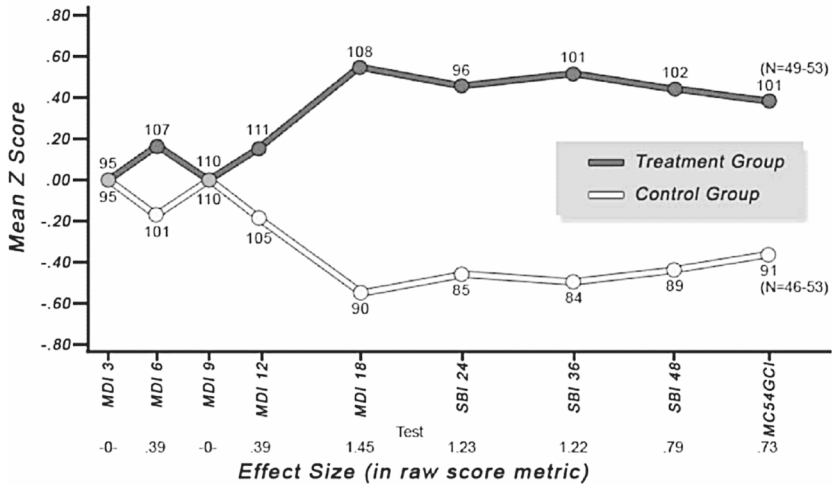


Figure 5. Z scores and mean standardized scores for high-risk preschool treatment and control children in the Abecedarian project at nine preschool measurement occasions. (From "Persistent Effects of Early Childhood Education on High-Risk Children and Their Mothers," by C. T. Ramey, F. A. Campbell, M. Burchinal, M. L. Skinner, D. M. Gardner, and S. L. Ramey, 2000, *Applied Developmental Science*, 4, p. 6. Reprinted with permission.)

age. We standardized the scores by summing over both groups and have plotted the mean scores of each group at each age in Z-score metric. Above and below each age point, we include the mean developmental quotient or IQ score for each group. The difference between the lines at each point represents the effect size of the treatment group relative to the control group on tests administered from 3 months of age through 54 months of age.

As Figure 5 shows, the two groups performed similarly during the first 9 months of life, and performed above national average. Thereafter, there is a precipitous decline in the control-group children so that by 18 months they are performing at the low end of the normal range (a Bayley Developmental Quotient of 90), in contrast to the treatment-group children, who did not decline. Throughout the remainder of this preschool period, using two different types of developmental assessments (the Stanford-Binet IQ and the McCarthy General Cognitive Index), the treatment group averaged approximately 14 IQ points higher than the control group. The effect sizes, shown on the x-axis, indicated the magnitude of the statistically significant differences. In the field of education, an effect size of 0.25 or greater is widely accepted as worthy of changing practice and policy. The effect size

from 18 months through 4.5 years ranged from 0.73 to 1.45 with a mean of 1.08—differences that are highly likely to be practically meaningful in children's everyday lives. This difference is also the typically reported difference between Caucasians and African Americans in population-based studies in the United States (Herrnstein & Murray, 1999). It is important to note that 98% of children participating in this study were African American. The implication of these experimentally produced differences is that *experience* clearly plays a major role in reported differences between blacks and whites. Further, this experience-driven disparity has a clear developmental course.

Figure 6, from Martin, Ramey, and Ramey (1990), presents the results from a clinical perspective. It illustrates the percentage of children in each treatment group who score in the normal range of intelligence—earning scores of 85 or higher on tests that have a national average of 100. For children in the control group, the cumulative toll is clear: over 90% were in the normal range at 6 months of age, but this drops steadily to only 45% by age 4 years. In contrast, over 95% of the children in the treatment group are in the normal range of cognitive abilities at all tested ages. This finding underscores the practical magnitude of the treatment-group differences and illustrates the role of positive experiences in preventing intellectual disabilities.

Replication of Abecedarian Benefits in the Preschool Years

The hallmark of science is replicability of procedures and findings. The ABC Project was replicated beginning in 1977 and 1978 in North Carolina in Project CARE (Ramey, Bryant, Sparling, & Wasik, 1985; Wasik, Ramey, Bryant, & Sparling, 1990) and then later replicated in the Infant Health and Development Project, a randomized, controlled study of 985 low birth weight, premature infants in eight different sites (Ramey et al., 1992). For these nine replication studies, significant benefits of the preschool educational treatment were documented in terms of children's higher performance on tests of intelligence, language, and social-emotional development at 3 years of age. The same developmental pattern that was observed in the Abecedarian Project also obtained in the Infant Health and Development Project (Ramey & Ramey, 1998b). Thus, this pattern seems robust and generalizable.

One of the most pressing public policy issues is determining which young children need and can benefit from Abecedarian-style educational enrichment. For instance, do all premature and low birth weight infants need a special early educational intervention program, or are family resources an important contributing factor to degree of developmental risk? The findings from the Infant Health and Development Program

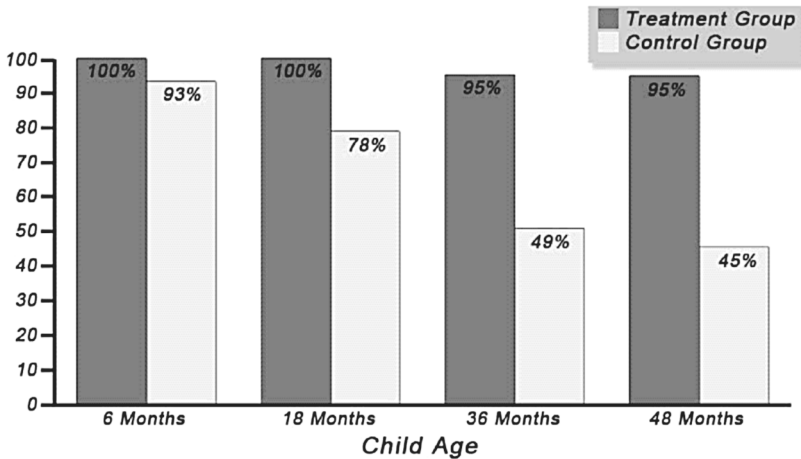


Figure 6. Percent of Abecedarian sample in normal IQ range (> 84) by age (longitudinal analysis). (From "The Prevention of Intellectual Impairment in Children of Impoverished Families: Findings of a Randomized Trial of Educational Day Care," by S. L. Martin, C. T. Ramey, and S. L. Ramey, 1990, *American Journal of Public Health*, 80, p. 845. Reprinted with permission.)

are informative. As shown in Figure 7, the 608 control-group children reveal the well-established effects of maternal education on children's intellectual and cognitive performance. That is, the children whose mothers have less than a high school degree perform at the very lowest levels (with an average IQ around 85—the same average that appears in almost all inner-city schools throughout the United States), followed next by mothers with a high school education, then some college education, then a four-year college degree. This stepwise and orderly difference reflects what is termed the "achievement gap" when children enter school. The pattern is quite different for the 377 children who received the preschool education treatment. Essentially, the ABC preschool program "leveled the playing field" for these children by supporting their performance to be at slightly above the national average. Notice, however, that the only children who did not display significant benefits of the preschool treatment were those whose parents graduated college: even though these babies were premature and low birth weight, they performed well above national average whether they received the ABC treatment or the other types of natural stimulation and programs that their parents arranged for them. This confirms what a number of other studies have shown, namely, that not all children need additional systematic education or enrichment in the form of a planned preschool program.

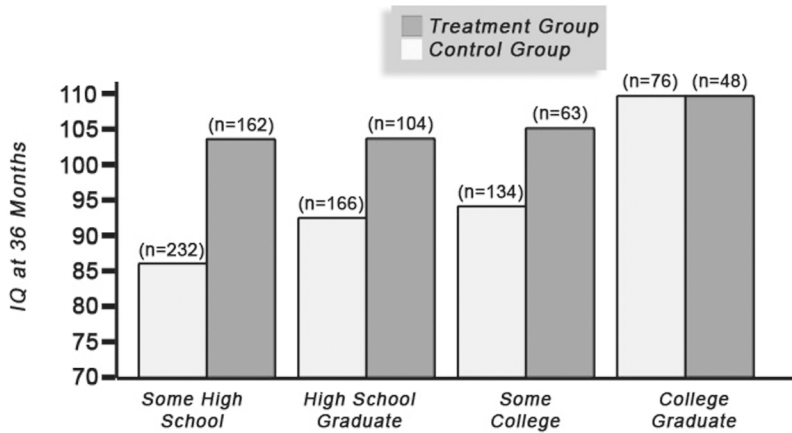


Figure 7. Infant Health and Development Program—maternal education \times treatment group. (From “Prevention of Intellectual Disabilities: Early Interventions to Improve Cognitive Development,” by C. T. Ramey and S. L. Ramey, 1998, *Preventive Medicine*, 27, p. 231. Reprinted with permission.)

Rather, those children whose families have the least resources—best estimated by their parents’ own educational and intellectual skills—are those who most need and most benefit from systematic provision of enriched learning opportunities. It is also important to note that there was no negative effect of the treatment on the intellectual performance of children from high-resource families. This is important because such families may seek high-quality care for their children for reasons other than educational enrichment—such as employment of the mothers.

Figure 8 summarizes some of the major findings of the Infant Health and Development Project replication of the Abecedarian Project from 12 to 36 months of age (Gross, Spiker, & Haynes, 1997). A developmental progression is noted for cognitive development that goes from the treatment and control groups not differing significantly at 12 months to differences favoring the early education group at 24 and 36 months. By 36 months the early education treatment group was superior to controls with children being more adaptive and prosocial, having fewer behavior problems, as well as having better vocabularies, receptive language, and reasoning skills. Also, by 36 months their homes were rated as developmentally more supportive and their mothers were observed as more positively interactive and better able to solve child-rearing problems. Thus, in addition to the cognitive and linguistic replication of the Abecedarian finding, the Infant Health and Devel-

	12 Months	24 Months	36 Months
Cognitive Development	NS	+	+
Adaptive and Prosocial Behavior	-	-	+
Behavior Problems	-	+	+
Vocabulary	-	+	+
Receptive Language	-	+	+
Reasoning	-	-	+
Home Environment	NS	-	+
Maternal Interactive Behavior	-	-	+
Maternal Problem Solving	-	-	+

NS = non-significant
 - = not measured
 + = significantly favoring the Early Intervention Group over the Control Group
¹: Treatment children have fewer behavior problems than controls

Figure 8. Outcomes affected positively ($*p < .01$) by the Infant Health and Development Program.

opment Project replication of the Abecedarian Project evidenced a broad array of positive effects in the children's social and emotional functioning as well as positive effects on the home environment and maternal behavior. In times of limited economic resources and many demands on states, it is important that these findings be considered when deciding whether to provide universal free preschool education or whether to selectively invest in programs that reach those who truly are high risk and who will likely demonstrate measurable gains. Our position is that universal pre-K is highly desirable, but if that is not affordable, then targeting is essential.

School-Age Results of the Abecedarian Program

In this section we briefly summarize the Abecedarian children's performance during their K–12 years in terms of key academic indicators. These data were presented in detail in articles by Ramey and Ramey (2000) and by Campbell, Pungello, Miller-Johnson, Burchinal, and Ramey (2001).

Reading achievement (on the Woodcock-Johnson Tests) of the children who received the ABC preschool treatment was significantly higher at every age tested (Figure 9a). These assessments were individually administered by highly qualified assessors who did not know about the children's preschool treatment or their performance on earlier tests. Math achievement (Figure 9b) also was significantly higher at each age for children in the treatment group.

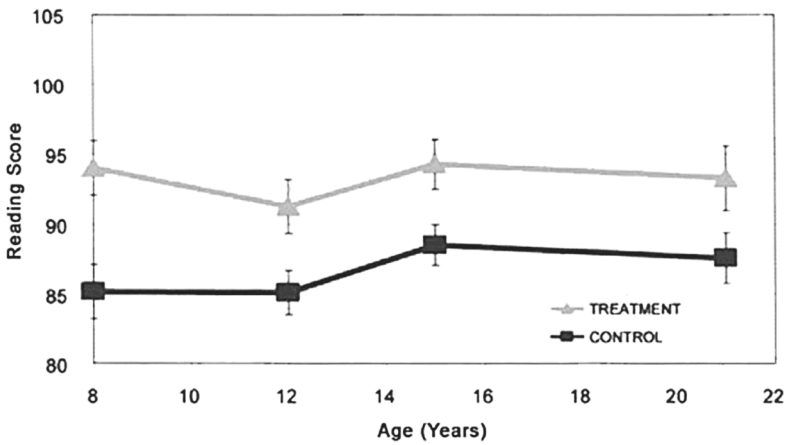


Figure 9a. Reading achievement over time. (From “The Development of Cognitive and Academic Abilities: Growth Curves From an Early Childhood Educational Experiment,” by F. A. Campbell, E. Pungello, S. Miller-Johnson, M. Burchinal, and C. T. Ramey, 2001, *Developmental Psychology*, 37, p. 237. Reprinted with permission.)

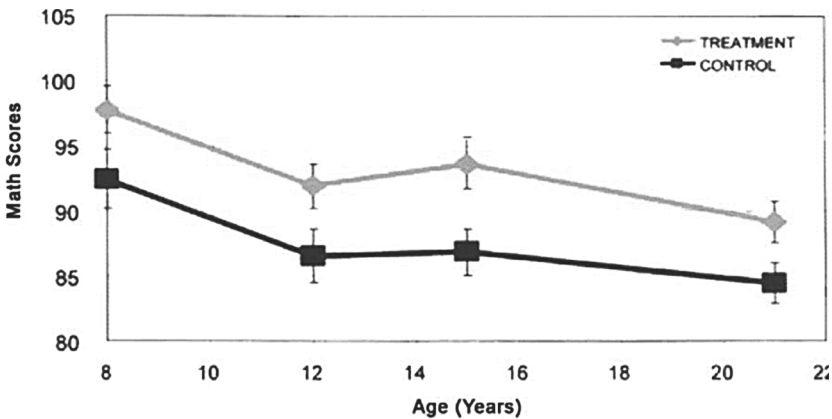


Figure 9b. Math achievement over time. (From “The Development of Cognitive and Academic Abilities: Growth Curves From an Early Childhood Educational Experiment,” by F. A. Campbell, E. Pungello, S. Miller-Johnson, M. Burchinal, and C. T. Ramey, 2001, *Developmental Psychology*, 37, p. 237. Reprinted with permission.)

In addition to performance on standardized and individually administered tests, the children’s real-world school performance is of paramount interest. Ramey and Ramey (2000) have reported two major practical outcomes associated with children receiving the ABC preschool treatment. The children’s rate of retention in grade by age 15

(i.e., failing at least one grade) was 56% for the control group—a rate that was cut nearly by half for the children in the treated group (30%). Another important outcome, one with both fiscal implications for school districts and states as well as personal consequences for the children and their families, is placement in special education. For children in the control group, almost half (48%) were placed in special education by the age of 15 (often after repeated academic failures and social adjustment problems), compared to only 12% of those in the ABC preschool group. The national average for special education placement is about 11%. In general, special education costs are approximately 2.5 times the cost of regular education, and children in special education are entitled to free public education until the age of 22. The stigmatization associated with special education has been considerable for many children, particularly those from low-income and/or minority families who do not have medically diagnosed disabilities (see, e.g., Donovan & Cross, 2002). Thus the cost savings are substantial both in psychological and fiscal terms.

Early Adulthood Results

We have had the rare opportunity to be able to follow 99% of the living children into adulthood. Here are a few of the results when they were 21 years old (Campbell et al. 2002). Not only were treated children still performing better on intelligence and reading and math assessments, but almost 70% of those who received the preschool treatment were engaged in skilled jobs (above entry-level positions) or enrolled in higher education, in contrast to only 40% of those in the control group. What was particularly noteworthy was that children from the treatment group were three times more likely to attend a four-year college than were control-group children: 36% versus 12%. Another young-adult advantage was the delay of almost 2 years in their age of having a first child—waiting until after high school completion. These practical positive outcomes appear to be mediated by improved cognitive, linguistic, and social competence (Burchinal et al., 1997).

Summary of Abecedarian Results

The key findings from the ABC/Abecedarian Project are consistent and encouraging. From 18 months through 21 years of age, the benefits include the children's higher IQ and higher reading and math scores; an improved understanding of their role in the educational process, reflected in improved "academic locus-of-control" scores (Walden & Ramey, 1983) where the children equate their effort and learning

with their grades and achievement (rather than attributing them to factors such as teacher bias, chance, or luck); increased social competence; more years of education; and greater likelihood of full-time and higher-status employment. The rates of grade repetition, special education placement, teen pregnancy, and smoking and drug use were all significantly lower than in the control group. We believe that these findings and those from other early intervention research programs have established that early intervention *can* be a major positive factor in altering the developmental course of high-risk children. Not all early intervention programs have produced such positive results, however.

Why Do Some Preschool Programs Fail?

The field of preschool education and early intervention is not without controversy or mixed results. There have been some well-intentioned preschool programs implemented in community settings and funded with public or private dollars that have not been able to demonstrate measurable benefits. Why? We have reviewed and analyzed these studies (e.g., Ramey & Ramey, 1998a, 2000), as have others (e.g., Haskins, 1989). Here are the most likely reasons that some programs have failed to close the achievement gap. First, many of those programs have not been able to provide the pre-service and in-service training needed for their teachers to ensure that the children receive a consistently high-quality learning and language environment. Second, many of those programs are not very intensive—often they are provided after children are 4 years old, are offered for just 3 or 4 hours per day, or operate for only 7 to 9 months. Third, many failed programs have a remedial rather than a preventive focus, making it more difficult to overcome the cumulative toll of limited learning. Fourth, upon close analysis, many of the well-intended programs have primarily supported families and only indirectly tried to help children, while frequently offering little or no direct teaching of important cognitive and language concepts to the children themselves. Although a family's total life situation is undeniably important, high-risk children themselves need to have firsthand experiences with mentoring and appropriate learning experiences in order to progress in their cognitive and linguistic skills. Unfortunately, there are many redundant and poorly coordinated family and early childhood programs that simply do not have adequate planning, professional expertise, or resources to deliver a preschool program that will result in major and sustainable cognitive and linguistic gains for children.

Recommendations for Public Policy

Based on the scientific evidence, we offer three major public policy recommendations. First, states and communities should develop strong leadership for a comprehensive early childhood educational initiative that is linked explicitly to K–12 learning and achievement within each state and community. In developing this initiative, it will be important to include the truly high-risk children (who are far fewer than all children in poverty), incorporate the scientific evidence about what really produces measurable benefits, and build upon the resources already available in states.

Our second recommendation is to combine funding streams and to promote innovative partnerships. This will help to strengthen existing programs that already are collaborative and can demonstrate positive outcomes; it will also be an opportunity to improve or eliminate those programs that are ineffective or poor in quality. In the future, continued support for preschool programs should be linked to ongoing performance measures of the program's quality and the demonstrated benefits to children in terms of their cognitive, linguistic, and social competence.

Our third recommendation concerns practical accountability. In the past, most early childhood intervention programs did not have well-designed and practically useful accountability systems. Thus it has not been possible to characterize the quality of programs or to engage in comparative analysis. This situation cannot continue if we seek to maximize young children's outcomes at reasonable costs. There is much controversy, anxiety, and frank politics surrounding proposed federal guidelines about measuring the development of young children. The fact is, there are excellent procedures available to observe and document the quality and amount of preschool education and child care. Child assessments should not be construed as high-stakes testing of children or a disguised effort to diminish public support for early childhood education; rather, child and program assessments should be seen as responsible (and long overdue) monitoring and evaluation procedures for public preschool services and supports targeted at our nation's most vulnerable young citizens. The cost of good accountability is relatively small and will not detract from the dollars and efforts available for direct services. To allow interventions and programs to be poorly monitored or not to hold them accountable for their educational quality or child developmental progress would not be in the best interest of our children or our country. Collectively, the well-being and the school readiness of our nation's children needs to be a major priority so that all young children receive the essential

transactions and the learning opportunities vital for their brain development and success in school. The past four decades have witnessed remarkable and strong bipartisan support for efforts to serve high-risk young children. It is now time to act upon this knowledge and to provide high-quality preschool programs for all high-risk children. We believe that this is a civil right of all children in a high-resource and ethical society.

It is also time to rethink the research agenda concerning early experience and the modifiability of cognitive development and school readiness for high-risk children. For more than 40 years the predominant research question has been whether school readiness could be modified—the so-called efficacy question. We submit that the evidence summarized and referred to in this paper adds up to a clear and consistent yes. We believe that the field of child development could make additional useful contributions by focusing on two major issues.

First, it would be very helpful to know more about the epidemiology of lack of school readiness. Population-based samples, ideally at the state and community levels of analysis, should be examined on a recurring basis to document the geographical distribution and extent of the school readiness problem. Such research is likely to show systematic concentrations of individuals and their sociodemographic characteristics. Geographical Information System mapping can be a useful data display tool to better understand the resulting public policy issues and concerns, including where and how large early intervention programs should be implemented to adequately meet the need for service.

Second, comparative analyses of alternative curricular and program features can help to improve program effectiveness by identifying core essentials and to control costs by eliminating weak or ineffectual program features and practices. This refocus would be a sign of the maturing science of human development that increasingly undergirds the provision of services to children and the institutions funded to support the development of individual children.

Conclusion

Yes, we now know that we *can* positively alter the development of young, disadvantaged children through the systematic provision of early childhood education. Now the question becomes: Can we do this better and more efficiently so that we can reach all children who need those services? We firmly believe that this new focus offers practical promise for children and society.

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