



EARLY CHILDHOOD EDUCATION PROGRAMS: BEST PRACTICES FOR MAXIMIZING SOCIAL MOBILITY

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EARLY CHILDHOOD EDUCATION PROGRAMS AND PARENTAL ENGAGEMENT

Early childhood education programs play a crucial role in promoting social mobility by providing disadvantaged children with a strong foundation for lifelong success. These programs recognize the importance of the early years in shaping a child's development and aim to mitigate the effects of socioeconomic disparities that can hinder upward mobility. By focusing on comprehensive interventions that enhance cognitive and noncognitive skills, as well as promoting positive parent-child interactions, early childhood education programs have shown significant potential in breaking the cycle of disadvantage and fostering long-term positive outcomes.

Research has consistently demonstrated that quality early childhood education programs can lead to improved educational attainment, increased employment prospects, reduced involvement in criminal activities, and better overall well-being. These programs address not only the cognitive aspects of a child's development, such as language and math skills, but also the noncognitive skills, including social and emotional competencies, self-regulation, and resilience. By nurturing these holistic skillsets from an early age, children from disadvantaged backgrounds are given a better chance to thrive and overcome the barriers they may face later in life.

One notable example of the impact of early childhood education programs is the High/Scope Perry Preschool Project (PPP), a pioneering study initiated in the 1960s. The project provided high-quality early education to low-income African American children in Michigan. Follow-up studies conducted over several decades demonstrated that participants in the PPP exhibited improved academic achievement, higher high school graduation rates, lower rates of criminal behavior, and increased economic self-sufficiency compared to their non-participating peers. These findings underscore the long-lasting benefits of early interventions in promoting social mobility.

Another example is the Carolina Abecedarian Project, which was a comprehensive early childhood education program conducted in the United States from the 1970s to the 1980s. The program aimed to provide high-quality educational experiences for disadvantaged children, starting in infancy and continuing through preschool. It implemented a structured curriculum, individualized instruction, and emphasized strong caregiver-child interactions. The results of the Abecedarian Project were highly significant and demonstrated the long-term benefits of high-quality early childhood education. The program's participants showed improved cognitive abilities, including higher IQ scores and academic achievement compared to control groups. Additionally, they exhibited better social-emotional skills, such as self-regulation, social competence, and positive personality traits.

Moreover, early childhood education programs extend beyond the classroom to involve parents and caregivers. Recognizing the critical role of the home environment in a child's development, these programs actively engage parents through home-visiting initiatives, parental education programs, and support networks. By empowering parents with knowledge and resources, these programs facilitate positive parent-child interactions, enhance parenting skills, and create a nurturing and stimulating environment for children to thrive.

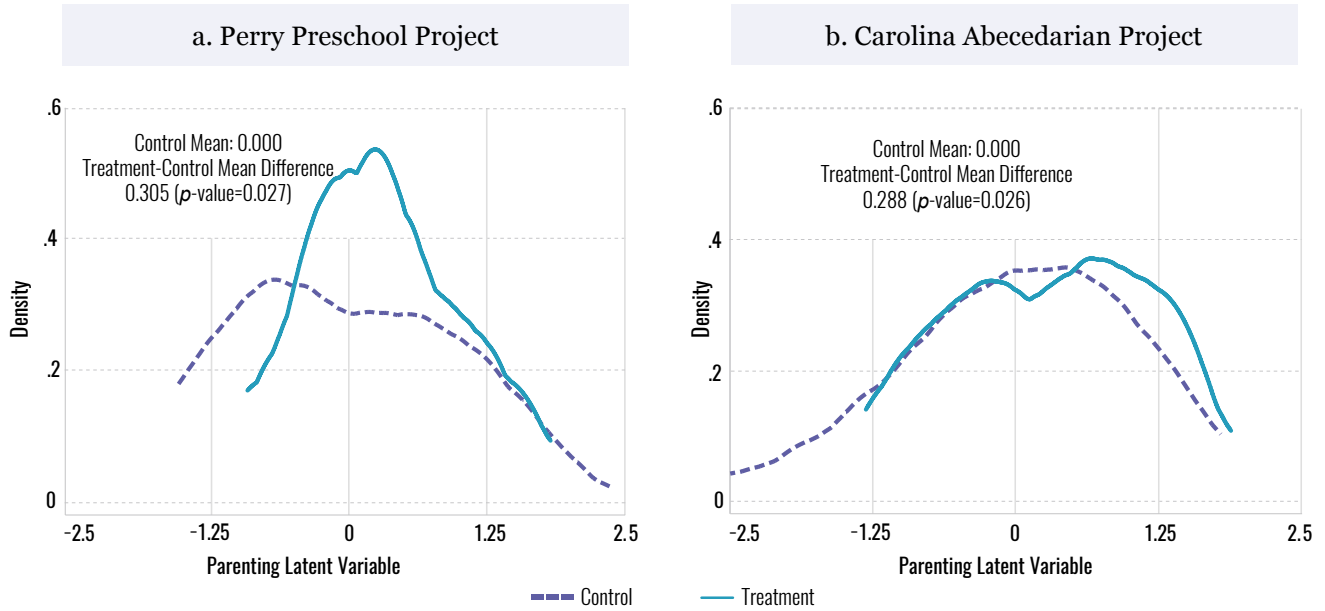
MEASURING PROGRAM RESULTS

Both PPP and Abecedarian were randomized. Thus, we have non-participant comparison groups (control groups) that allow valid comparisons to determine the outcomes and mechanisms driving the success of the programs. For example, in Perry, we observe the Parenting at Risk Index (PARI) and in Abecedarian we observe the Home Observation for Measurement of the Environment (HOME). PARI is a measurement tool designed to assess the quality of parenting or parental investment. It examines various aspects of parent-child interactions, including emotional support, cognitive stimulation, and the provision of a stimulating home environment. HOME is another assessment tool used to evaluate the quality of the home environment and its influence on child development. It assesses different aspects of the home environment, such as the availability of learning materials, parental responsiveness, and the organization of the physical space. We therefore know how the participants of Perry and Abecedarian were parented and how much parenting changed after they participated in the programs.

The latent (average or index) variables are standardized by subtracting their control-group mean and dividing it by their control-group standard deviation for the purpose of comparability. The distributions of the measures by treatment status for each program are depicted in Figures 1a and 1b. Notably, both the PPP and Abecedarian programs exhibit an average enhancement of 0.3 in the parenting or parental investment measures, with p-values of 0.027 and 0.026, respectively. These findings provide substantial support for the interpretation of PPP and Abecedarian as initiatives specifically targeting the needs of disadvantaged families. By improving the environments in which participants grow up during childhood, these programs demonstrate a significant improvement in the interactions between child participants and their caregivers, which continues to have a lasting impact long after the program concludes.

Figure 1a shows the probability density function of a latent variable describing the parental investment (parenting) received by the original participants of Perry by treatment status. We also display the control-group mean and the treatment-control mean difference in the index together with the permutation p-value for this difference. The null hypothesis for the difference is that it is less than or equal to 0. Figure 1b is analogous in format to Figure 1a, with reference to the parental investment received by the original participants of Abecedarian.

Figures 1A + 1B | PARENTING RECEIVED BY THE ORIGINAL PARTICIPANTS OF THE PERRY PRESCHOOL AND CAROLINA ABECEDARIAN PROJECTS.

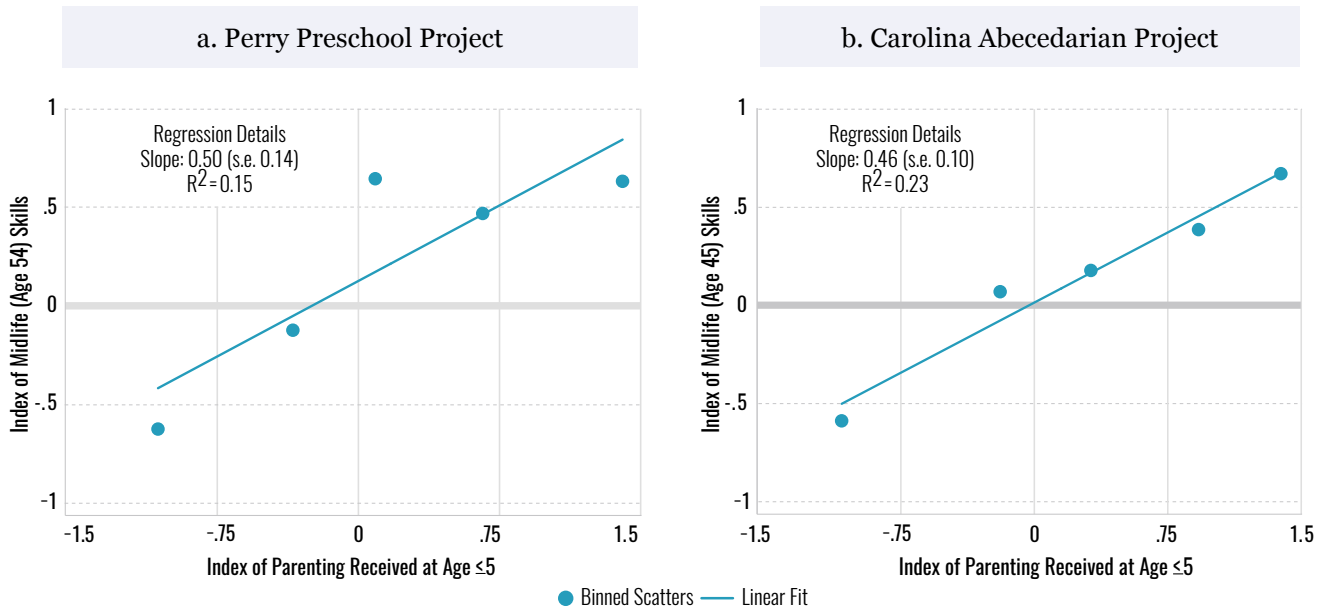


(Abbreviation: s.e. = standard error)

It is also possible to investigate the extent to which improved parent-child interactions generated by the program serve as fundamental elements for its impact on skills. For each program, Figures 2a and 2b illustrate the relationships between the average measures of midlife cognitive and noncognitive skills, as previously described, and the parenting measures depicted in Figures 1a and 1b. The plot showcases the estimated linear relationship that accurately fits the observed relationship. Notably, the measure of parental investment explains a minimum of 15% of the variation in the average of these two skills. It is noteworthy that these measures are based on data collected within a 50-year interval. In both programs, a one-standard-deviation increase in the posttreatment measure of parenting, collected when the original participants were at most five years old, is associated with a half-standard-deviation increase in the average of midlife skills.

Figure 2a displays the linear relationship between the latent variable of parental investment received by the original participants of Perry and an average of their midlife cognitive and noncognitive skills measured at age 54, together with the corresponding description of the linear regression. Figure 2b is analogous in format to 2a, with reference to the original participants of Abecedarian, whose midlife skills are measured at age 45.

Figures 2A + 2B | PARENTING RECEIVED BY THE ORIGINAL PARTICIPANTS OF THE PERRY PRESCHOOL AND CAROLINA ABECEDARIAN PROJECTS AND THEIR ADULT SKILLS.



(Abbreviation: s.e. = standard error)



LONG-TERM PROGRAM IMPACT

Moving beyond the focus of end-of-program impacts, Table 1 summarizes the long-run impacts of the programs. The sustained effects over the life cycle are discussed, particularly regarding midlife skills. The findings demonstrate that both programs have significant and enduring impacts on cognition, as measured by standardized tests (Raven and Stroop) administered at age 54 for PPP and age 45 for Abecedarian. PPP increased cognition by half a standard deviation (p-value = 0.01), while Abecedarian showed a one-third standard deviation increase (p-value = 0.031). These results challenge the notion of fadeout in treatment effects on cognitive skills commonly discussed in previous literature.

Table 1 | BASELINE CHARACTERISTICS, OUTCOMES, AND FERTILITY: ORIGINAL PARTICIPANTS OF THE PERRY PRESCHOOL AND ABECEDARIAN PROJECTS

	Perry Preschool Project			Carolina Abecedarian Project		
	Control Mean	MD	MD p-value	Control Mean	MD	MD p-value
a. Baseline						
IQ (Perry) or mother's IQ (Abecedarian)	78.54	1.03	0.387	83.49	1.83	0.399
Socioeconomic index	8.62	0.17	0.53	21.82	-1.93	0.089
Mother does not work ¹	0.69	0.22	0.002	0.39	-0.22	0.01
Mother's year of birth	1,959.97	0.03	0.95	1,974.35	-0.15	0.674
b. Midlife skills[†]						
Cognitive	0.00	0.48	0.005	0.00	0.34	0.031
Noncognitive	0.00	0.50	0.011	0.00	0.47	0.031
c. Midlife education [‡]						
High-school graduate	0.52	0.20	0.021	0.53	0.20	0.025
College graduate	0.05	0.02	0.453	0.09	0.21	0.007
d. Midlife outcomes [*]						
Married	0.25	0.09	0.082	0.42	0.01	0.486
Labor income (2021 USD)	16,298.91	7,826.94	0.018	37,527.95	13,044.70	0.098
Household labor income (2021 USD)	25,121.43	13,243.21	0.007	37,247.62	14,632.67	0.071
Accumulated days (Perry) or times (Abecedarian) in jail or prison	1,326.71	-380.83	0.237	0.14	-0.12	0.027
Never arrested (Perry) or accumulated arrests (Abecedarian)	0.46	0.18	0.039	0.61	0.26	0.151
Physical health	0.00	-0.02	0.553	0.00	0.28	0.096
Mental health	0.00	0.31	0.072	0.00	0.20	0.111
e. Midlife fertility [†]						
Any children	0.80	-0.01	0.878	0.89	-0.03	0.748
Age at onset	22.63	0.87	0.469	21.93	2.23	0.122
Number of children	2.42	0.15	0.727	2.31	-0.19	0.524
>5 children	0.07	0.02	0.727	0.00	0.02	0.928
f. Sample sizes						
Original participants at baseline	65	-7		57	2	
Original participants at midlife follow-up	50	2		45	6	

¶ The difference between treatment-group mothers in Abecedarian and Perry is that Abecedarian provided full-day childcare and Perry did not.

† Based on identical variables observed at age 54 for Perry and 45 for Abecedarian.

‡ Based on identical variables of completed years of education for both Perry and Abecedarian.

* For Perry, marriage is the fraction of years married between ages 20 and 40; labor income is the average earnings from labor income between ages 20 and 40; household labor income is the previous variable in addition to average spouse's labor income between ages 20 and 40 (if married); accumulated days in prison and never arrested are observed up to age 54. For Abecedarian, marriage is an indicator of whether an individual is married at age 45; labor income is measured at age 45; household income is the previous variable in addition to spouse's labor income at age 45 (if married); times in jail and accumulated arrests are measured at age 30. For Perry, physical health is a latent variable of measures describing prevalence and intensity of diabetes, stroke, heart disease, self-rated health, body mass index, and waist-to-hip ratio at age 54. For Abecedarian, an analogous variable is constructed using information at age 34. For Perry, mental health is a latent variable of measures describing depression and antisocial behavior at age 54. For Abecedarian, an analogous variable is constructed using information at age 45.

Panels a and e present the control-group mean and treatment-control mean difference (MD) for the outcome in the label for the Perry Preschool and Carolina Abecedarian Projects. For each treatment-control MD, we present the permutation p-value associated with the null hypothesis that MD is equal to 0. We bold p-values when they are lower than 0.10. Panels b to d are analogous in format to panels a and e. The null hypothesis in these panels is that MD is less than or equal to 0.

Furthermore, the programs exhibited positive impacts on noncognitive skills, as measured by constructed latent variables for positive personality traits. Both Perry and Abecedarian yielded increases of half a standard deviation in positive personality measures (p-values of 0.01 and 0.02, respectively). The effects of the programs extended beyond skills to include increased high-school graduation rates, improved labor income during adulthood, and reduced involvement in criminal behavior.



Table 2 | SUMMARY OF INTERGENERATIONAL OUTCOMES: CHILDREN OF THE ORIGINAL PARTICIPANTS OF THE PERRY PRESCHOOL AND CAROLINA ABECEDARIAN PROJECTS

	Male children			Female children		
	Control Mean	MD	MD p-value	Control Mean	MD	MD p-value
a. Perry Preschool Project						
High school graduate (age 18 or older)	0.67	-0.01	0.582	0.74	0.13	0.026
College graduate (age 23 or older)	0.04	0.08	0.063	0.31	-0.09	0.846
Employed (age 23 or older)	0.48	0.19	0.040	0.41	0.09	0.218
Never arrested (age 18 or older)	0.37	0.14	0.089	0.78	0.06	0.210
In good health (age 18 or older)	0.82	0.12	0.006	0.85	0.10	0.030
Not a parent (ages 14 to 22)	1.00	0.00	1.000	0.83	0.12	0.234
Never divorced (age 23 or older)	0.93	0.07	0.028	0.86	0.11	0.016
b. Carolina Abecedarian Project						
High school graduate (age 18 or older)	0.66	-0.06	0.718	0.28	0.18	0.067
College graduate (age 23 or older)	0.55	-0.08	0.683	0.18	0.25	0.068
Not idle (age 15 or older)†	0.91	0.06	0.083	0.98	0.00	0.572
In good health (age 18 or older)	0.83	0.18	0.000	0.88	0.10	0.133
Not a parent (ages 14 to 22)	0.63	0.17	0.069	0.94	-0.01	0.584

† Enrolled in school or working.

Panel a presents the control-group mean and treatment-control mean difference (MD) for the intergenerational outcome in the label for the Perry Preschool Project. Intergenerational outcomes are for the average child. We construct them by averaging within original program participants across up to their five eldest children. For each MD, we present the permutation p-value associated with the null hypothesis that MD is less than or equal to 0. We bold p-values when they are lower than 0.10. Panel b is analogous in format to panel a for the Carolina Abecedarian Project.

The analysis of PPP and ABC shows that the benefits of the programs outweigh their costs, with significant net social benefits (benefits less cost) per participant. Table 3 illustrates the magnitude and source of this net benefit. It breaks the benefits into items in thousands of dollars of 2021. The benefits for the parents, who are able to work and educate themselves more with the de facto childcare provided by the programs, are substantial in ABC. Participants increase their education and labor income. They also decrease their burden to the criminal system by committing less crimes and to the health system by improving their health behaviors. The cost per participant of Perry is \$23,478 in 2021 dollars. The cost per participant of ABC is \$105,530 dollars. Recent studies indicate that the programs have an average net social benefit per participant (average total benefits less cost per participant) of \$175,548 and \$672,359, respectively. Estimates of the net social benefits account for the welfare cost of distorting taxation required to fund programs. The corresponding benefit-cost ratios are 6.0 and 5.2. The source studies show that the reported estimates are robust to extensive robustness checks of the assumptions underlying their estimation.

Table 3 | SUMMARY OF BENEFIT-COST ANALYSIS OF THE PERRY PRESCHOOL AND CAROLINA ABECEDARIAN PROJECTS

	Perry Preschool Project	Carolina Abecedarian Project
Benefits		
Parental income	NA	133,326
Education	303	-5,151
Labor income	68,348	146,672
Crime	88,065	513,420
Health	54,048	63,794
Other	NA	-21,408
Costs		
Total program cost	23,478	105,530
Net social benefit (benefits less costs)		
Baseline program cost	187,287	725,124
Subtract deadweight loss	175,548	672,359
Benefit-cost ratio		
Baseline program cost	9.0	7.9
Subtract deadweight loss	6.0	5.2

Abbreviation: NA = not available.

The benefit components of the Perry Preschool Project are based on observation, except for health which is based on forecast, while the benefit components of the Abecedarian Project are based on forecast. The total cost is observed for both programs. For Perry, there are no monetized benefits for the parents due to their potentially improved income given the de facto child care component of the program. Other costs refer to savings due to less expenditure in childcare alternatives, which were not available for control-group Perry participants.

KEY TAKEAWAYS AND GUIDANCE FOR FUTURE PROGRAMS

Notably, a key insight gleaned from the literature on child development is the vital role of parenting in establishing attachment, guidance, and support. Although successful programs may appear distinct on the surface, they all prioritize the promotion of effective parenting. Some programs achieve this indirectly by encouraging parental visits to centers or by fostering positive parental responses to child engagement stimulated through participation in centers. On the other hand, more focused home-visiting programs, which are less resource-intensive than comprehensive programs, have demonstrated surprising cost-effective efficacy.

Some policy proposals that will facilitate social mobility are as follows:

Expansion of Access: One policy proposal could involve expanding access to high-quality early childhood education programs for disadvantaged children. This could include increasing the availability of affordable or subsidized early education options, prioritizing underserved communities, and ensuring that children from low-income backgrounds have equal opportunities to participate in these programs.

Quality Standards and Teacher Training: Implementing and enforcing quality standards for early childhood education programs is essential. Policy proposals may focus on establishing guidelines for curriculum, teacher qualifications, and classroom environments to ensure that programs provide optimal learning experiences. Additionally, investing in ongoing professional development and training for early childhood educators can enhance the quality of instruction and support the holistic development of children.

Parental Engagement and Support: Recognizing the crucial role of parents and caregivers, policy proposals may emphasize the importance of parental engagement and support within early childhood education programs. This could involve implementing home-visiting initiatives, offering parenting education programs, and creating networks of support for parents to enhance their knowledge and skills in fostering their child's development.

Integration of Noncognitive Skills: Policy proposals may highlight the significance of integrating noncognitive skills, such as social-emotional development and resilience, into early childhood education curricula. Providing resources and training for educators to address these skills can help children develop the necessary competencies to navigate challenges and succeed in their academic and personal lives.

Long-Term Monitoring and Evaluation: Establishing mechanisms for long-term monitoring and evaluation of early childhood education programs is essential to assessing their effectiveness and informing policy decisions. This could involve tracking children's outcomes throughout their educational journeys and beyond, and examining indicators such as academic achievement, employment rates, and social well-being to gauge the long-term impact of these programs on social mobility.

Early childhood education programs have the potential to be effective early interventions in the lives of disadvantaged children by supporting them in building the skills necessary for success in school and in life. Designed well, these programs can prevent the need for future, often costlier, interventions and prepare participants for upward social mobility. But not every early childhood education program is equally effective. Programs that acknowledge and support the key role that parents play in child success and those that incorporate the noncognitive skill development will be more effective than those that do not. The examples set by the Perry Preschool Project and the Carolina Abecedarian Project offer policymakers a helpful evidence-based guide in establishing successful early childhood programs. Understanding their design and results can inform a better discussion around the best strategies to ensure all children have the opportunity to succeed.

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