

APPENDIX

SUMMARY OF RECENT RESEARCH ON THE BENEFITS OF PRE-K PROGRAMS

I. EFFECTS ON CHILD OUTCOMES

Bagnato, Stephen J., Jennifer Salaway, and Hoi Suen. *Pre-K Counts in Pennsylvania for Youngsters' Early School Success: Authentic Outcomes for an Innovative Prevention and Promotion Initiative*. Pittsburgh, PA: Early Childhood Partnerships, 2009. http://www.earlychildhoodpartnerships.org/Attachments_NEWS/SPECS%20fo%20PKC%20EXSUM--Single%20Page%20Print%20Version--FINAL1.pdf

The Pennsylvania Pre-K Counts program serves 10,000 children across the state through the development of a network of schools and support infrastructure. This evaluation of its effects found a 20% reduction in number of children classified as developmentally delayed and at-risk. Participating children were also found to be better academically prepared than the national norms and showed drastically reduced rates of assignment to special education.

Barnett, W. Steven, Kwanghee Jung, Min-Jong Youn, and Ellen C. Frede. *Abbott Preschool Program Longitudinal Effects Study: Fifth Grade Follow-Up*. NIEER, 2013. <http://www.first5kids.org/sites/default/files/2129.pdf>

This study of the prekindergarten program established in New Jersey's disadvantaged "Abbott" districts finds benefits in all 31 served communities. In addition to lowering the rate of referral to special education and grade retention, participation in one year of prekindergarten reduced the achievement gap by 10-20%, 20-40% for two-year participants. These gains are persistent up to the fifth grade, the most recent year measured. These gains can be expected to continue to grow because program quality has continued to improve in the years since the participation of the study cohort.

Belfield, Clive R., and Henry M. Levin. "Educational Interventions to Raise High School Graduation Rates." In *The Price We Pay: Economic and Social Consequences of Inadequate Education*, edited by Clive Belfield and Henry M. Levin, 177-199. Brookings Institution Press, 2007.

In this chapter of their book on educational inadequacy, the authors undertake a comparative analysis of multiple types of interventions to raise high school graduation rates. They find that prekindergarten intervention programs show a notable and consistent capacity to raise graduation rates for children growing up in poverty. In an area where most interventions fail to deliver measurable results, prekindergarten is among the most powerful and cost-effective ways to accomplish this goal.

Camilli, Gregory, Sadako Vargas, Sharon Ryan, and W. Steven Barnett. "Meta-Analysis of the Effects of Early Education Interventions on Cognitive and Social Development." *The Teachers College Record* 112, no. 3 (2010). http://spot.colorado.edu/~camillig/Papers/38_15440.pdf

In a meta-analysis of five decades' worth of research on the impact of prekindergarten programs, this study finds significant effects on cognitive outcomes, social skills and school progress in children who attend preschool before entering kindergarten. This analysis included 120 high-quality experimental and quasi-experimental studies, making it one of the most comprehensive studies to date. The consistent findings across these studies add considerable weight to the conclusion that preschool interventions yield real and enduring benefits to children.

Gormley Jr, William T., Ted Gayer, Deborah Phillips, and Brittany Dawson. "The Effects of Universal Pre-K on Cognitive Development." *Developmental Psychology* 41, no. 6 (2005): 872. <http://www.crocus.georgetown.edu/reports/oklahoma9z.pdf>

Oklahoma is one of a small number of states with an existing prekindergarten program that can reasonably be described as approaching universal access. The universality of the program complicates measurement of its impact, due to the difficulty of finding a comparable control group. To overcome this problem, this study uses a regression discontinuity design and finds significant improvements in prereading, prewriting, and prenumeracy skills for a diverse population of enrolled students.

Heckman, James J. "Skill Formation and the Economics of Investing in Disadvantaged Children." *Science* 312, no. 5782 (2006): 1900-1902.

Citing evidence from the fields of neuroscience and developmental psychology, this paper describes the foundational importance of early childhood experience on later development. Not only are development and learning hierarchical, with later learning dependent on the neural pathways created by prior experience, but cognitive, linguistic, social, and emotional competencies are interrelated. Consequently, programs that invest in creating these foundational competencies are the best way of preventing the deleterious social consequences of low educational attainment.

Henry, Gary T., Laura W. Henderson, Bentley D. Ponder, Craig S. Gordon, Andrew J. Mashburn, and Dana K. Rickman. Report of the Findings from the Early Childhood Study: 2001-02. Atlanta, GA: Andrew Young School of Policy Studies, Georgia State University, 2003. <http://131.96.2.68/publications/2003/earlychildhood.pdf>

A comparison of Head Start, private, and public prekindergarten programs in Georgia found that students of the universal public program outperformed their counterparts from private preschools and Head Start in several of the measured categories of academic readiness and in ratings by kindergarten teachers. These competitive, and in places superior, outcomes occur in spite of the socioeconomic advantages enjoyed by many students at private preschools.

HighScope Educational Research Foundation. *Lifetime Effects: The HighScope Perry Preschool Study Through Age 40*. HighScope Press, 2005.

The HighScope/Perry Preschool Study is one of the earliest and most authoritative studies of the long-lasting positive effects of quality preschool programs. Starting in 1962, this longitudinal study follows 123 children from poor families who participated in a high-quality preschool program. It finds large long-term academic, social, and societal benefits resulting from participation in the model program. Most notable are a 17% increase in high school graduation rates, increased lifetime earnings, and a 50% reduction in arrests.

New York State Education Department. *Evaluation of the New York State Experimental Prekindergarten Program*. Albany: The University of the State of New York, 1982.

This randomized study of New York State's own Experimental Pre-K program, the forerunner to Universal Pre-K, shows that children in full-day prekindergarten programs are more likely to meet reading and math standards and less likely to repeat a grade or be referred to special education than children in half-day programs.

Ramey, Craig T., and Sharon L. Ramey. "Early Learning and School Readiness: Can Early Intervention Make a Difference?" *Merrill-Palmer Quarterly* 50, no. 4 (2004): 471-491. <http://www.psy.cmu.edu/~sieglar/423-ramey04.pdf>

In a review of the many randomized controlled trials modeled after the influential Abecedarian Project (1972-1975) this article compiles the evidence of the impact that quality preschool and other early interventions can have on high-risk children from low-income families. Significant educational benefits are found in participants in Abecedarian and its imitators. These findings and their replication in many different locations show that the benefits of quality preschool to low-income children is not a statistical anomaly, but a reliable outcome of this kind of early intervention.

Reynolds, Arthur. *Success in Early Intervention: The Chicago Child-Parent Centers*. University of Nebraska Press, 2000.

This volume presents a longitudinal analysis of the Chicago Child-Parent Center Early Education Program, a large-scale intervention that targets children in poor neighborhoods for quality early childhood services at a reasonable cost. Starting in 1967, it provides two years of prekindergarten services to at-risk families and children in the form of preschool, parental support, extended time, and school-age support services. The long-term effects of the program include a reduction in remediation and assignment to special education, an increase in high school graduation rates, higher rates of employment, and lower instances of crime. This is accomplished in a publicly-run program that serves over 2000 children each year, for per-child cost that is a fraction of the cost of small-scale model programs.

Yoskikawa, Hirokazu, Christina Weiland, Jeanne Brooks-Gunn, Margaret R. Burchinal, Linda M. Espinosa, Jens Ludwig, Katherine A. Magnuson, Deborah Phillips, and Martha J. Zaslow. *Investing in Our Future: The Evidence Base on Preschool Education*. Society for Research in Child Development, 2013. <http://fcd-us.org/sites/default/files/Evidence%20Base%20on%20Preschool%20Education%20FINAL.pdf>

This comprehensive review of the evidence base for preschool education synthesizes the best available research on the subject. It concludes, among other things, that quality preschool programs are beneficial and cost-effective for both disadvantaged and middle-class children, that there are significant positive effects to a second year, that effects remain despite test-score convergence in early elementary school, and that there are measurable benefits from targeted comprehensive support services to disadvantaged children.

II. IMPORTANCE OF FULL-DAY PROGRAMS

Cryan, John R., Robert Sheehan, Jane Wiechel, Irene G. Bandy-Hedden. "Success Outcomes of Full-Day Kindergarten: More Positive Behavior and Increased Achievement in the Years After." *Early Childhood Research Quarterly* 7 no. 2 (1992): 187-203.

This retrospective look at children who attended prekindergarten programs of different durations finds that those who attended full-day prekindergarten were better prepared both academically and behaviorally than those who attended half-day programs. While reports from kindergarten teachers establish that all children who attended prekindergarten had levels of academic and behavioral preparedness in the acceptable range, they concluded that who attended full-day prekindergarten were noticeably better prepared than their half-day counterparts.

DeSiato, Donna J. Gilberti, *Does Prekindergarten Experience Influence Children's Subsequent Educational Development? A Study of Kindergarten Teachers' Perceptions and Students' Performance*. Teaching and Leadership – Dissertations. Paper 46, 2004. http://surface.syr.edu/tl_etd/46

This recent study of prekindergarten effects on school readiness from Syracuse showed that twice as many children who attend full-day prekindergarten enter kindergarten at the appropriate academic level compared with peers with half-day or no preschool experience. These findings were consistent across measures of educational readiness, subsequent development, and literacy.

Robin, Kenneth B., Ellen C. Frede, and William S. Barnett. *Is More Better? The Effects of Full-Day vs. Half Day Preschool on Early School Achievement*. NIEER, 2006. <http://nieer.org/resources/research/IsMoreBetter.pdf>

This research by the National Institute for Early Education Research (NIEER) indicates that, by the spring kindergarten assessment, children in the extended duration (full-day) prekindergarten program improve 11 to 12 standard points on vocabulary and math skills, in contrast with six to seven point gains for children in the half-day control group programs. It finds that the magnitude of difference is consistent with findings in other studies that measure differences between types of prekindergarten programs.

III. BENEFITS OF UNIVERSAL VERSUS TARGETED PREKINDERGARTEN

Barnett, W. Steven, and Donald J. Yarosz. *Who Goes to Preschool and Why Does It Matter?* National Institute for Early Education Research, Rutgers University, 2007. <http://www.nieer.org/resources/factsheets/18.pdf>

According to this summary of analysis of the 2005 National Household Education Survey, in spite of nearly half a century of targeted preschool programs for the poor, this approach has failed to come close to enrolling all poor children. Less than half of three and four year old children living in poverty are enrolled in preschool. The numbers for four year olds alone, at whom a majority of targeted preschool efforts are aimed, is just 60%.

Barnett, W. Steven, Megan E. Carolan, Jen Fitzgerald, and James H. Squires. *The State of Preschool 2012: State Preschool Yearbook*. National Institute for Early Education Research, Rutgers University, 2012. <http://nieer.org/sites/nieer/files/yearbook2012.pdf>

Existing programs that offer universal access to preschool to all children, such as those of Oklahoma and the District of Columbia, have managed to achieve enrollment rates that approach and exceed 90% of four year olds when counting public prekindergarten and Head Start. Other public preschool programs in Vermont, Wisconsin, West Virginia, and Texas have improved rates of enrollment by expanding program eligibility beyond poverty targeting.

Lamy, Cynthia, W. Steven Barnett, and Kwangee Jung. *The Effects of Oklahoma's Early Childhood Four-Year-Old Program on Young Children's School Readiness*. National Institute for Early Education Research, Rutgers University, 2005. <http://nieer.org/resources/research/multistate/ok.pdf>

This large-scale study of Oklahoma's universal Early Childhood Four-Year-Old Program used a regression discontinuity design to measure the impact of the program on the academic readiness of 838 children from across the state. It finds that children enrolled in the public prekindergarten program showed significantly more growth in vocabulary, math skills and pre-reading skills. Enrolled children were found to experience 28%, 44% and 88% more growth in each of the respective categories over the course of the year.

Weiland, Christina, and Hirokazu Yoshikawa. "Impacts of a Prekindergarten Program on Children's Mathematics, Language, Literacy, Executive Function, and Emotional Skills." *Child Development* (2013); DOI: 10.1111/cdev. 12099.

This recent study of Boston Public Schools' universal preschool program showed gains for all children regardless of income group or ethnicity. Moderate to large gains in math, language, and literacy were seen, in addition to improvements in noncognitive areas such as behavioral regulation and emotional development. The regression discontinuity measures gains above and beyond out-of-school growth for students of the same age.

IV. ECONOMIC RETURN ON INVESTMENT

Belfield, Clive R. *Early Childhood Education: How Important Are the Cost Savings to the School System?* New York: Columbia University, Teachers College, 2004. <http://www.plan4preschool.org/documents/ny-cost-saving.pdf>

This study calculates the cost savings to the State of New York from early childhood education. Using conservative estimates, the savings to the K-12 system alone are predicted to offset 41-62% of the initial investment in early childhood education. The total medium-term savings to the state are predicted to be in the range of \$2,591–\$9,547 per child.

Heckman, James J., and Dimitriy V. Masterov. *The Productivity Argument for Investing in Young Children*. NBER Working Paper No. 13016, 2007. http://jenni.uchicago.edu/human-inequality/papers/Heckman_final_all_wp_2007-0322c_jsb.pdf

This paper analyzes potential for prekindergarten interventions to reduce inequality and increase productivity without tradeoffs in economic efficiency. It finds that the disproportionate benefits experienced by disadvantaged groups, particularly African-American males, make for a compelling argument in favor of investment in preschool programs.

Heckman, James J., Soeng H. Moon, Rodrigo Pinto, Peter A. Savelyev, and Adam Yavitz. *The Rate of Return to the HighScope Perry Preschool Program*. NBER Working Paper, 2010. http://www.nber.org/papers/w15471.pdf?new_window=1

In this study of the return on investment of the High/Scope Perry Preschool Project, a more conservative methodology is used to account for imperfections in the random assignment process and assumptions made regarding the calculation of returns. This “worst-case” estimation still finds annual societal returns of 7-10%, which are larger than those of the vast majority of interventions.

HighScope Educational Research Foundation. *Benefits, Costs, and Explanation of the High/Scope Perry Preschool Program*. Paper presented at the Meeting of the Society for Research in Child Development, Tampa, Florida, 2003. http://www.highscope.org/file/Research/PerryProject/Perry SRCD_2003.pdf

Taking advantage of the exceptionally complete data available on participants in the High/Scope Perry Preschool Project, this study has concluded that the total benefits to society are seven times larger than the cost of the program. These estimates solely measure societal benefits, and do not include the numerous benefits to the individual, such as increased educational attainment, earnings, family stability, and reduced likelihood of criminality.

Lynch, Rogert G. *Exceptional Returns: Economic, Fiscal, and Social Benefits of Investment in Early Childhood Development*. Washington DC: The Economic Policy Institute, 2004.

This book provides a comprehensive look at the returns on investments in universal access to high quality preschool at the national level. It finds that despite the significant upfront costs of such a large-scale investment, the medium and long-term returns to government budgets and society at-large would create a net-positive fiscal impact of hundreds of billions of dollars.

Reynolds, Arthur J., Judy A. Temple, Barry A.B. White, Suh-Ruu Ou, and Dylan L. Robertson. “Age 26 Cost–Benefit Analysis of the Child-Parent Center Early Education Program.” *Childhood Development* 82 no.1 (2001): 379-404.

According to this economic analysis of the Chicago Child-Parent Early Education Program, the combined benefits and savings generated by participation are substantial, generating over ten dollars for every dollar spent on preschool by the age of 26. These benefits take the form of increased individual earnings, increased tax revenue, and reduced costs to the criminal justice system.

Schweinhart, Lawrence J., Zongping Xiang, Marijata Daniel-Echols, Kimberly Browning, and Tomoko Wakabayashi. *Michigan Great Start Readiness Program Evaluation 2012: High School Graduation and Grade Retention Findings*. State of Michigan Department of Education, 2012. <http://bridgemi.com/wp-content/uploads/2012/06/GSRP-evaluation-may-21-12.pdf>

Among its many other effects on cognitive development, behavior, and academic achievement, Michigan’s Great Start Readiness Program has virtually eliminated the difference in grade retention between the high-poverty children served by its prekindergarten and the general population. This difference alone yields savings that are equivalent to 43% of the cost of this targeted prekindergarten program.