

SHORT REPORT

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# Use of early childhood longitudinal studies by policy makers

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## Abstract

**Background:** Modern ECCE research began with the birth of the U.S. Head Start program in the 1960s; however, policy makers and the public paid little attention to it until several studies that had random assignment or wide representativeness received wide but targeted dissemination to them. In fact, policy makers required repeated dissemination to dispel misinterpretations of the findings, such as the belief of some that the value of ECCE has been disproved or that ECCE could have long-term effects and return on investment regardless of its quality.

**Findings:** Toward this goal, we published six research monographs, held news conferences, wrote 87 articles, and made many presentations to groups that were influential in ECCE policy making.

**Conclusions:** We draw three conclusions from this experience: (1) it was worthwhile; (2) there are too few studies of ECCE; (3) researchers and policy makers should work together more closely.

## Background

Modern ECCE research began in the 1960s, with the birth of Head Start in 1965. Because national spending on such research has been light—compared to national spending on medical research and national spending on ECCE itself, for example—most studies are small-scale, lacking both random assignment of children and wide representativeness, and attention has concentrated on those few studies that have at least random assignment—such as the HighScope Perry Preschool Study (Schweinhart et al. 2005) and the Abecedarian Child Care Study (Campbell et al. 2014); or wide representativeness—such as the Chicago Longitudinal Study (Reynolds et al. 2011). These studies found that high-quality early childhood programs have long-term effects on participants' lives in categories like arrest and employment and strong economic return on investment that transcend categories like cognitive and socioemotional. However, a study of national Head Start that implemented both random assignment of children and national representativeness found only modest effects through third grade for the program with little promise of longer-term effects (Puma et al. 2012).

Early childhood researchers and advocates made a substantial effort to convey the long-term results to policy makers. David Weikart and I, for example, over three decades presented news of the long-term findings and return on investment to the general public

through national media and to policy makers through national associations and gatherings in most states. The result is layered: policy makers and the public widely know the idea that ECCE programs lead to long-term effects and return on investment; a few know that only high-quality ECCE programs result in such effects; and few indeed act as if they know that economic compromises in high-quality ECCE programs lead to compromises in long-term effects and return on investment.

While this may be partly due to inadequate communication of implications, it is mostly due to policy makers' selective hearing and response, indulging in the human tendency to embrace benefits while minimizing costs. It is time to commit to more research as well as more programs. Allocate a small fraction—say, 5 % of new ECCE funding—to experimentation to identify the elements of ECCE programs that lead to long-term effects and return on investment. Then, as results become available, introduce these elements into general program funding. So early childhood researchers should continue to focus their efforts on results that inform policy makers and the general public and should communicate closely with reporters and policy makers to refine their sensitivity to what is both useful and feasible in ECCE policy development.

At the same time, high-quality ECCE is only one arrow in the quiver of policy makers who want to improve the lot of disadvantaged people and reduce inequality in society. While it has been useful to single out high-quality ECCE for longitudinal research, it has led some to expect these programs alone to overcome the many educational inequities wrought by poverty. Other strategies—such as better schooling, worthwhile after-school programs, and parent education programs—deserve longitudinal study as well. Comprehensive state data collection systems now being put into place are a major tool to conduct such study.

### **Early childhood research findings**

Contemporary ECCE research began with a few small-scale studies showing that high-quality early childhood programs produce an intellectual boost. This boost proved to be short-lived, but in some of these same programs, it led to long-term effects such as improved high school graduation rate, a higher employment rate, a lower crime rate, and return on investment. Some other, more recent studies of high-quality early childhood programs have corroborated the short-term findings, but large-scale studies representing national Head Start (Puma et al. 2012) and the Tennessee Voluntary Prekindergarten Program (Lipsey et al. 2013) have not, suggesting that we have not yet found the key components of program quality that lead to program effectiveness.

The body of contemporary ECCE research began in the 1960s preceding the advent of Head Start in 1965. In the early 1960s, two books—*Intelligence and experience* by Hunt (1961) and *Stability and change in human characteristics* by Bloom (1964)—made a case that early childhood programs should give a permanent intellectual boost to educationally disadvantaged children. These books laid the groundwork for a new generation of studies designed to examine the potential effectiveness of early childhood programs for young children living in poverty. In 1962, Susan Gray began the Early Training Project out of Peabody College in Murfreesboro, Tennessee (Gray et al. 1982); Martin and Cynthia Deutsch began a preschool program in Harlem, New York (Jordan et al. 1985); and David Weikart began the HighScope Perry Preschool Program at Perry Elementary

School in the Ypsilanti, Michigan, Public Schools (Weikart et al. 1970). These programs all confirmed the hypothesis that early childhood program experience leads to improved intellectual performance for educationally disadvantaged children; but this intellectual boost lasts only a couple years, dropping back to what it would have been without early childhood program experience. The first evaluation of the national Head Start program also found only immediate effects (Westinghouse Learning Corporation 1969). This apparent fadeout of a crucial effect led many people, notably hereditarian Jensen (1969), to conclude that all the effects of early childhood program experience fade away. Despite the theoretical predictions, permanently improved intellectual performance was not to be the vehicle of long-term effects.

The HighScope Perry Preschool Study and studies like it continued to collect data as children grew up. These studies have become exemplary in part because the interventions were highly intentional. Toward the end of elementary school, the Perry study began to find that children with early childhood program experience had better age-grade placement than their randomly assigned peers—fewer of them were assigned to special education or repeated a grade (Schweinhart and Weikart 1980). In addition, the young people with early childhood program experience had higher achievement test scores and more of them graduated from high school. These effects occurred despite, possibly even because of, the temporary effect on intellectual performance (Schweinhart 2016). These findings for age-grading and high school graduation were also found in several other studies of the Consortium for Longitudinal Studies (Lazar et al. 1982). The same combination of effects was found in Michigan's Great Start Readiness Program longitudinal evaluation (Schweinhart et al. 2012).

Over the years, the Consortium disbanded, and a new generation of researchers replaced the older one. The Carolina Abecedarian Enhanced Child Care Project began in 1972; like Perry, it employed random assignment techniques. The Chicago Child-Parent Centers that began in 1967 began its longitudinal study in 1986 (Reynolds et al. 2011); while it did not employ random assignment, it was a relatively large-scale program, operating across the city of Chicago. The HighScope Perry Preschool Study found that the early childhood program group adults did better than the no-program-group adults by having higher school achievement, a higher high school graduation rate, a higher employment rate, higher earnings, a lower crime rate, and strong return on investment (Schweinhart et al. 2005). The Abecedarian Project (Campbell et al. 2002) found all these effects except crime and also found persistently higher intellectual performance and college attendance. The Chicago project (Reynolds et al. 2011) found the same effects as Perry. These three studies have emerged as the standard-bearers for the finding that high-quality early childhood programs for children living in poverty have long-term effects and strong return on investment. Table 1 presents the principal characteristics and outcomes of these studies. The diversity of the programs finding similar results suggests that successful programs can be designed in many different ways.

Other studies, however, have not found such promising short- and long-term effects for early childhood programs as these studies found. In particular, the Head Start Impact Study (Puma et al. 2012)—which was essentially the second national evaluation of Head Start—found only weak and ephemeral effects on children's literacy, mathematics, and social skills. This was particularly disappointing because it sought to remedy the defects

**Table 1 Characteristics of three long-term preschool studies**

Characteristic	Carolina Abecedarian	Chicago Child-Parent Centers	HighScope perry
Design			
Beginning year	1972	1985	1962
Type of setting	College town	Major city	College town
Sample size	111	1539	123
Assignment to groups	Random	Existing classes	Random
Scale	Research	Service	Research
Program entry and exit age	0.4–5	3–4	3–4
Program hours a day, days a week	8, 5	2½, 5	2½, 5
Program weeks a year, years	50, 5	35, 2	35, 2
Parent program	No	Family and health services	Weekly home visits
School-age services	Yes	Yes	No
Control group experience	Some child care arrangements	No preschool program	No preschool program
Common outcomes			
Intellectual performance tests—years effect found	Ages 3–21	–	Ages 4–7
School achievement tests—years effect found	Age 15	Ages 14–15	Ages 7–27
Placed in special education—P vs. NP	25 vs. 48 %	14 vs. 25 %	65 vs. 60 %
Retained in grade—P vs. NP	31 vs. 55 %	23 vs. 38 %	35 vs. 40 %
High school graduate—P vs. NP	67 vs. 51 %	50 vs. 39 %	65 vs. 45 %
Males—P vs. NP		43 vs. 29 %	50 vs. 54 %
Females—P vs. NP		57 vs. 48 %	84 vs. 32 %
Arrested by 21—P vs. NP	45 vs. 41 %	17 vs. 25 %	15 vs. 25 %
Age at birth of first child—P vs. NP	19.1 vs. 17.7	–	22.2 vs. 19.4
Cost-benefit analysis <sup>a</sup>			
Program cost	\$34,476	\$6956	\$15,166
Program cost per year	\$13,362	\$4637	\$8540
Public return, total	–	\$26,637	\$195,621
Public return, per dollar invested	–	\$3.83	\$12.90
Societal return, total	\$130,300	\$49,364	\$258,888
Societal return, per dollar invested	\$3.78	\$7.10	\$17.07

<sup>a</sup> Per participant in 2000 dollars discounted at 3 % annually

P program group; NP no-program group

of the first evaluation, and Head Start had driven forward on the strength of the longitudinal studies that had found long-term effects. It sought to employ random assignment, although changing conditions made it difficult to achieve—crossovers bedeviled the design, with 60 % of those assigned to no Head Start finding a way to attend an early childhood program anyway. It also sought to draw a nationally representative sample of

Head Start programs, despite the challenge of some Head Start programs serving most of the eligible children in their catchment areas. Another study that sought to apply random assignment to a large population and found disappointing results was the Tennessee Voluntary Prekindergarten Study (Lipsey et al. 2013). It found immediate but not longer-term effects on the children it served.

Yet other studies have continued to find strong short-term early childhood program effects, in Tulsa (Gormley et al. 2005), Boston (Weiland and Yoshikawa 2013), and various states (Barnett et al. 2005). Heckman and his colleagues have conducted reanalyses of the Perry and Abecedarian studies that do not rely on parametric assumptions and basically confirm the original results (Campbell et al. 2014; Heckman et al. 2010a, b). The question is no longer whether early childhood programs can have long-term effects, but rather which ones do and which ones do not. A leading hypothesis for explaining the difference that fits the data well is that high-quality early childhood programs have long-term effects while low-quality programs do not.

It places the three standard-bearing programs and programs in Tulsa and Boston in the high-quality camp and the national Head Start program and Tennessee's Voluntary Prekindergarten Program in the mixed-quality camp. It is easy to see one difference between the first programs and the federal and state programs. The scale is different, even between the city-wide Chicago program and programs that serve the nation or Tennessee. The national program, Head Start, has a complex history, involving many policy decisions made for purposes other than to maximize program effectiveness. But surely scale alone cannot explain the difference between success and failure, and the difference between the Tulsa early childhood program and the Tennessee prekindergarten program is more highly nuanced.

### The dissemination

Like virtually all countries, the U.S. is governed by policymakers—heads of state, bureaucrats, legislators, and judges at federal, state, and local levels. Because the U.S. is a democratic republic, citizens vote on candidates for public office and big issues, delegating most of their authority to elected policy makers. Other countries have various forms of government, but everywhere policy makers are responsible for most policies.

The dissemination of early childhood program research findings began in academic journals and later extended to policy makers and the public through the mass media. HighScope played a special role in disseminating the results through monographs; articles; press conferences; and speeches to behavioral scientists, policy makers, educators, early childhood educators, and groups of early childhood advocates in most states.

The dissemination of program research and evaluation almost always extends between the early childhood researchers who conduct such studies and the administrators who commission them. The participating children and their parents have a special right to know the results as do others like them. But early childhood program research has extended beyond informing to advocacy, because of the nature of the results and their history.

Early childhood program research that began in the 1960s was based on the bold hypothesis that early childhood programs could affect lives. It echoed an earlier generation's Freudian belief in the priority of early childhood (Freud 1905), but in cognitive

rather than psychosexual development. This belief was confirmed by a first round of studies, seemingly disconfirmed by a second round of studies, reconfirmed by a third round of studies, leading to current studies seemingly supporting both conclusions. At each round, the hypothesis was refined, first to the idea that not all early childhood programs have long-term effect, only high-quality ones.

The first round of studies was disseminated by the usual academic journals, papers, and presentations, as was the second round challenge. Thus, when the Consortium's finding came out, academic journals were not considered enough to get the word to relevant policy makers. The Consortium published its findings in a scientific monograph published by the Society for Research in Child Development (Lazar et al. 1982) and in a book to which each team of investigators contributed a chapter (Consortium for Longitudinal Studies 1983), but also communicated with groups of policy makers directly and immediately, by numerous speeches by Irving Lazar and other members of the Consortium.

For several reasons, HighScope Foundation played a special role in the dissemination of longitudinal findings of the effects of high-quality early childhood programs. First, the HighScope Perry Preschool Study was persistently present, from the first round of studies to the third round and beyond. Second, the effects found in this study were themselves persistent; indeed, it was one of the first studies to find many effects—the intellectual boost; age-grade effects; return on investment; school achievement at 14; high school graduation at 19; and employment, earnings, and crime reduction at 27 and 40. Third, Carnegie Corporation of New York funded a policy center at HighScope, which at first focused broadly on the relationship between early childhood research and policy, but came to focus almost exclusively on the dissemination of the findings of the Perry study and similar studies to policy makers and the public. HighScope received 10 years of funding from Carnegie Corporation to sustain this policy center with several professional staff. Fourth, the interest of policy makers in hearing the results of these studies was crucial to maintain this dissemination effort.

HighScope Press published six monographs that comprehensively reported the study and its findings at the end of the program (Weikart et al. 1970), and at ages 10 (Weikart et al. 1978), 15 (Schweinhart and Weikart 1980), 19 (Berrueta-Clement et al. 1984), 27 (Schweinhart et al. 1993), and 40 (Schweinhart et al. 2005). A follow-up study at 50 is under way.

After each monograph was published, we held a news conference, the first in 1980 at Carnegie Corporation headquarters in New York City, and subsequent ones in Washington, DC. These news conferences led to enormous news coverage of the findings throughout the U.S. and around the world. Reporters and feature writers frequently called (and, later, sometimes emailed) to get information and quotes for their articles. Michigan newspapers, The New York Times, and The Washington Post were especially interested over the years.

We engaged in an extensive effort to write articles reporting the study and articles of larger scope that included the study, 87 in all: 6 up to when Perry study participants were 10, 11 when they were 10–19, 42 when they were 19–27, 21 when they were 27–40, and 7 since they were 40. We were invited to write these articles, so they are a good gauge of interest in the study. They appeared mostly in journals for researchers and educators. A

few were directed specifically at policy makers and the public; we collaborated on policy papers with the Council of the Great City Schools and the National Governors Association. These articles, HighScope's website, and a few other websites, became the hub of dissemination as the Internet grew from novelty to institution. A current Google search yields about 1,260,000 hits for "Perry Preschool." "High/Scope," the name of the organization that houses the Perry study and the curriculum first developed in Perry, yields about 7,652,000 results.

We made many presentations on the long-term benefits and return on investment of high-quality early childhood programs, throughout the U.S and around the world. We met with a dozen national associations of behavioral scientists, including the American Society of Criminology (with special recognition by the Academy of Experimental Criminology) and the American Psychological Association. We made eight presentations at meetings of the American Educational Research Association and six presentations at meetings of the Society for Research in Child Development. We met with staff of national policy-making groups including staff in the White House and Congress and the Committee for Economic Development; the Education Writers of America, the National Education Goals Panel in 1991, the National Governors Association, the National Conference of State Legislatures, the National Association of Counties, and the National League of Cities. We met with dozens of national associations of educators, including the Council of Chief State School Officers, the National Association of State Boards of Education, the American Association of School Administrators, the Council of the Great City Schools, the National Association of Elementary School Principals, the National Education Association, and the American Federation of Teachers. We met with another several dozen national associations of early childhood educators, including the National Head Start Association, the Administration for Children, Youth and Families, and the Gesell Institute. We were deeply involved with the National Association for the Education of Young Children, presenting at conferences annually and serving on the Michigan board from 1987 to 1994 and the national board from 1993 to 1997. We also played a leadership role in the first years of Michigan's Early Childhood Investment Corporation from 2005 to 2008. We held an invited national conference of early childhood advocates annually from 1980 to 1990 and in 1998.

We met with state associations of early childhood advocates in most states, except the less populous states, with multiple meetings in California, Florida, Idaho, Illinois, Indiana, Kentucky, Minnesota, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Tennessee, and Vermont. Of course, we made many presentations in Michigan. We established Voices for Children projects in Michigan, Ohio, North Carolina, and South Carolina, meeting with state policy makers ourselves and training groups of early childhood advocates to give speeches to influential local groups. We were similarly active in California. In Michigan, we met with key state legislators prior to the large expansion of the state's Great Start Readiness Program in 2013.

We also made presentations in Canada, Mexico, England, Ireland, the Netherlands, Sweden, and West Germany.

These papers and presentations contributed to the worldwide introduction and expansion of ECCE programs of higher quality intended to contribute to children's

development and reduce inequality. In the U.S., examples are expanded funding of Head Start and state prekindergarten programs.

### **Conclusions**

We draw three conclusions from this experience. The first is that the findings of longitudinal studies of high-quality early childhood programs profit from broad dissemination to early childhood advocates at national and state conferences. The second is that there are few early childhood longitudinal studies. The third is that early childhood researchers and policy makers should work more closely together.

The first conclusion from this dissemination effort is that the findings of the longitudinal studies of high-quality early childhood programs profit from broad dissemination at conferences, especially to relevant policy makers. This effort got the message out in a way that many professionals could understand and care about. But this dissemination involved two-way communication. In addition to our communication of the message, many audiences were affected by the way we talked about our topic. We learned how to say things that made sense to the audiences. The presentations were all alike in the gist of their message, and each was different from the others in responding to the needs and interests of each audience. For example, we were presenting differences between the mean scores of the program and no-program groups until we recognized that some in our audiences did not understand mean scores; after that, we used group percentages except with groups of behavioral scientists. We presented the economic return on investment to society, a term that includes participants and taxpayers, until a state policy maker expressed interest only in the economic return to taxpayers. For a time, we tried to combine the findings of all the studies, presenting meta-analytic statistics, but questions indicated that audiences were primarily interested in hearing from us about the results of the HighScope Perry Preschool study.

The second conclusion comes from comparing the domain of early childhood longitudinal studies to other domains, particularly in the relatively well-funded field of medical research: there is a paucity of early childhood longitudinal studies of adequate quality. Only two small-scale studies, Perry and Abecedarian, have used random assignment techniques to find long-term results and economic return on investment, and they cannot claim widespread representativeness of early childhood programs or populations of children. The Chicago study has city-wide representativeness of a type of early childhood program and the population of children it serves, but at the cost of random assignment. The Head Start Impact Study (Puma et al. 2012) has national representativeness and random assignment, but largely sacrificed a selective focus on high quality to represent Head Start nationally. The Head Start Impact Study sought to represent all Head Start programs and succeeded thereby in showing that programs that followed Head Start regulations at the time were not on the average of sufficient quality to generate long-term results.

The third conclusion is that early childhood policy makers and researchers should work more closely together. Researchers should learn what questions policy makers are interested in and how research can best be designed to answer the questions they ask. Policy makers should integrate research and research findings into their policy formulations and the questions they ask. The need for more early childhood longitudinal

research findings suggests the need for this integration. We do not agree with Farran (2016) that this lack of research is a reason not to expand early childhood programs further until enough research is done. Even with its few studies, ECCE has more longitudinal research than other levels of K-12 education. We do know enough to continue expanding early childhood programs, but should set aside some of this funding—say, 5 % of new funding—for evaluative research on early childhood programs. Early childhood program evaluations are a step in the right direction, but evaluations tend to be project-specific, without systematic relation to each other. Early childhood program research needs to be larger scale and more systematic than most program evaluations tend to be so that questions and answers can be cumulative and build on each other. What are the essential elements of program quality? How can these elements be validly and reliably measured so that it is clear when they are present or absent? Here we agree with Farran (2016) that the current state of measurement of preschool program quality is not adequate. Validity means not only that a measure of preschool program quality is what it claims to be, but also that it predicts program effectiveness.

So early childhood policy making should include a 5 % set-aside of new funding for experimentation with what policies lead to effective early childhood programs. This research should be highly coordinated so that it can be cumulative. Early childhood policy makers should follow this research and inform their policy formulations with it. Early childhood researchers should listen carefully to policy makers about what questions need to be answered. This model of collaboration applies especially to Head Start, where policy develops almost independently of research. An example is Head Start's Program Review Instrument for Systems Monitoring, which was almost completed when a couple of researchers (Martha Abbott-Shimm and myself) were added to the committee guiding it its development—a step in the right direction, but too little too late.

Early childhood researchers should fashion their reporting so that policy makers can act on it. Too often it is laden with research jargon that is unintelligible to policy makers and practitioners. Granted, it is challenging to master the complexities of research methodologies that permit intelligible framing of results. But it is in this way that early childhood researchers can communicate valid findings to policy makers and practitioners and everyone can work together to realize the great potential of high-quality early childhood programs.

#### Competing interests

The author declares that he has no competing interests.

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#### References

- Barnett, W. S., Lamy, C., & Jung, K. (2005). *The effects of state prekindergarten programs on young children's school readiness in five states*. New Brunswick, NJ: Rutgers University, National Institute for Early Education Research. <http://www.nieer.org/resources/research/multistate/fullreport.pdf>.
- Berrueta-Clement, J. R., Schweinhart, L. J., Barnett, W. S., Epstein, A. S., & Weikart, D. P. (1984). Changed lives: the effects of the Perry Preschool program on youths through age 19 (Monographs of the HighScope Educational Research Foundation, 8). Ypsilanti, MI: HighScope Press. Excerpts in F. M. Hechinger (Ed.) (1986). *A better start: New choices for early learning*. New York: Walker and Company.
- Bloom, B. (1964). *Stability and change in human characteristics*. New York: Wiley.
- Campbell, F. A., Conti, G., Heckman, J. J., Moon, S. H., Pinto, R., Pungello, E., et al. (2014). Early childhood investments substantially boost adult health. *Science*, 28, 1478–1485.

- Campbell, F. A., Ramey, C. T., Pungello, E. P., Sparling, J., & Miller-Johnson, S. (2002). Early childhood education: young adult outcomes from the Abecedarian Project. *Applied Developmental Science*, 6, 42–57.
- Consortium for Longitudinal Studies. (1983). *As the twig is bent lasting effects of preschool programs*. Hillsdale, NJ: Erlbaum.
- Farran, D. (2016). *We need more evidence in order to create effective pre-k programs. Research Early Childhood Development Report*. Washington, DC: The Brookings Institution. <http://www.brookings.edu/research/reports/2016/02/25-need-more-evidence-create-effective-prek-programs-farran>.
- Freud, S. (1905). *Three essays on the theory of sexuality*. Trans. In J. Strachey (Ed.). Willington, CT: Martino Fine Books. Accessed June 3 2011.
- Gormley, W. T., Gayer, T., Phillips, D., & Dawson, B. (2005). The effects of universal pre-k on cognitive development. *Developmental Psychology*, 41(6), 872–884. doi:10.1037/0012-1649.41.6.872.
- Gray, S. W., Ramsey, B. K., & Klaus, R. A. (1982). *From 3 to 20: The Early Training Project*. Baltimore: University Park Press.
- Heckman, J. J., Moon, S. H., Pinto, R., Savelyev, P. A., & Yavitz, A. Q. (2010a). The rate of the return to the HighScope Perry Preschool Program. *Journal of Public Economics*, 94, 114–128.
- Heckman, J. J., Moon, S. H., Pinto, R., Savelyev, P. A., & Yavitz, A. Q. (2010b). Analyzing social experiments as implemented: a reexamination of the evidence from the HighScope Perry Preschool Program. *Quantitative Economics*, 1, 1–46.
- Hunt, J. M. V. (1961). *Intelligence and experience*. New York: Ronald Press.
- Jensen, A. R. (1969). How much can we boost IQ and scholastic achievement? *Harvard Educational Review*, 39, 1–123.
- Jordan, T. J., Grallo, R., Deutsch, M., & Deutsch, C. P. (1985). Long-term effects of early enrichment. A 20-year perspective on persistence and change. *American Journal of Community Psychology*, 13, 393–415.
- Lazar, I., Darlington, R., Murray, H., Royce, J., & Snipper, A. (1982). Lasting effects of early education: a report from the Consortium for Longitudinal Studies. *Monographs of the Society for Research in Child Development*, 47(2/3), 1–151.
- Lipsey, M. W., Hofer, K. G., Dong, N., Farran, D. C., & Bilbrey, C. (2013). *Evaluation of the Tennessee Voluntary Prekindergarten Program: Kindergarten and first grade follow-up results from the randomized control design (Research Report)*. Nashville, TN: Vanderbilt University, Peabody Research Institute. [https://www.my.vanderbilt.edu/ttnprekevaluation/files/2013/10/August2013\\_PRL\\_Kand1stFollowup\\_TN-VPK\\_RCT\\_ProjectResults\\_FullReport1.pdf](https://www.my.vanderbilt.edu/ttnprekevaluation/files/2013/10/August2013_PRL_Kand1stFollowup_TN-VPK_RCT_ProjectResults_FullReport1.pdf).
- Puma, M., Bell, S., Cook, R., Heid, C., Broene, P., & Downer, J. (2012). *Third grade follow-up to the Head Start Impact Study*. Final Report. OPRE Report # 2012-45. Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services.
- Reynolds, A. J., Temple, J. A., Ou, S., Arteaga, I. A., & White, B. (2011). School-based early childhood education and age-28 well-being: effects by timing, dosage, and subgroups. *Science*, 333, 360–364. doi:10.1126/science.1203618.
- Schweinhart, L. J. (2016). Lessons on sustaining early gain from a life-course longitudinal study. In A. J. Reynolds & A. J. Rolnick (Eds.) *Sustaining early childhood gains*. Cambridge: Cambridge University Press.
- Schweinhart, L. J., Barnes, H. V., & Weikart, D. P. (1993). *Significant benefits: The HighScope Perry Preschool Study through age 27 (Monographs of the HighScope Educational Research Foundation, 10)*. Ypsilanti: HighScope Press.
- Schweinhart, L. J., Xiang, Daniel-Echols, M., Browning, K., & Wakabayashi, T. (2012). *Michigan Great Start Readiness Program: evaluation 2012: High school graduation and grade retention findings*. Ypsilanti, MI: HighScope Educational Research Foundation. [http://www.highscope.org/file/Research/state\\_preschool/MGSRP%20Report%202012.pdf](http://www.highscope.org/file/Research/state_preschool/MGSRP%20Report%202012.pdf).
- Schweinhart, L. J., Montie, J., Xiang, Z., Barnett, W. S., Belfield, C. R., & Nores, M. (2005). *Lifetime effects: The HighScope Perry Preschool Study through age 40*. Ypsilanti: HighScope Press.
- Schweinhart, L. J., & Weikart, D. P. (1980). *Young children grow up: The HighScope Perry Preschool Study through age 15*. Ypsilanti: HighScope Press.
- Weikart, D. P., Bond, J. T., & McNeil, J. (1978). *The Ypsilanti Perry Preschool Project: Preschool years and longitudinal results through fourth grade (Monographs of the HighScope Educational Research Foundation, 3)*. Ypsilanti, MI: HighScope Press.
- Weikart, D. P., Deloria, D., Lawser, S., & Wiegerink, R. (1970). *Longitudinal results of the Ypsilanti Perry Preschool Project (Monographs of the HighScope Educational Research Foundation, 1)*. Ypsilanti, MI: HighScope Press.
- Weiland, C., & Yoshikawa, H. (2013). Impacts of a prekindergarten program on children's mathematics, language, literacy, executive function, and emotional skills. *Child Development*, 84, 2112–2130.
- Westinghouse Learning Corporation. (1969). *The impact of Head Start: an evaluation of the effects of Head Start on children's cognitive and affective development (Vols. 1–2)*. Washington, DC: Clearinghouse for Federal, Scientific, and Technical Information.

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