

Sustaining the Benefits of Early Childhood Education Experiences: A Research Overview

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Over the past decade, there has been increased recognition of the short- and long-term benefits of high-quality early childhood education programs, but the systems needed to sustain these benefits throughout early learning transitions (and beyond) have not yet been fully implemented.

My oldest nephew is six years old and in first grade. Despite overcoming significant challenges during the first five years of his life, he is doing pretty well. He's reading above grade level and performing at grade level in math. He demonstrates good cognition and general knowledge, along with social competence and executive functioning skills consistent with what one might expect from a six-year-old. He approaches learning experiences with curiosity and persists in completing tasks that are difficult. He has also has

lived the first five years of his life in a single-parent household because his mother has been incarcerated and in and out of rehabilitation programs for drug addiction – a factor we know from the literature on early childhood development could put him at risk for developmental and learning delays (Shonkoff 2010; Karoly, Kilburn & Cannon 2005; Shonkoff & Phillips 2000).

What, then, bolstered my nephew's progress in learning and enabled him to be resilient despite these realities? Some of this, surely, is a result of the caring

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adults in his life, with whom he was able to form stable attachments and who engaged him in learning experiences grounded in his community and home culture. These supports acted as protective factors (Center for the Study of Social Policy 2009) helping to counteract those risks. He also, however, attended an early childhood education (ECE) program that was accredited by the National Association for the Education of Young Children (NAEYC), widely thought to be the “gold standard” of quality in ECE (Neugebauer 2009). His first five years of life took place during a period of considerable attention to the role of early experiences on brain development and the impact of high-quality early childhood education on ameliorating risk factors and reducing achievement gaps in the early elementary grades.

The newest research in this field tackles the question of how to ensure that the gains made in ECE will be sustained. Research has begun to look at ECE systems that create the infrastructure for an aligned, effective set of policies and programs to support young children’s development and learning from birth through third grade. Much of my work as a researcher in the field of ECE has focused on exploring the potential of ECE systems, and the governance of those systems, to create a coherent learning continuum for children from birth through grade three. I continue this work at the National Institute for Early Education Research (NIEER), where we focus on conducting high-quality research on pre-K that can inform policy and practice. Indeed, NIEER was created in 2001 for the purpose of conducting independent research on pre-K and for seeking to increase the transparency and accountability of pre-K policies. NIEER is uniquely positioned at the intersection of research, policy, and practice, enabling its faculty to take a holistic view of pre-K and be responsive to the needs of the field.

THE IMPORTANCE OF EARLY CHILDHOOD EDUCATION: INCREASING RECOGNITION AND A SHIFT IN FOCUS

Decades of research on child development and the benefits of ECE as an intervention now indicates that high-quality programs result in both short- and long-term benefits to young children (Shonkoff & Phillips 2000). We know that a child’s family and community environments are inextricably linked to his or her development, and stable attachment relationships can mitigate risk factors and promote positive social, emotional, and cognitive developmental outcomes (Bronfenbrenner 1986; Ainsworth & Bowlby 1991). We also know from studies focusing on educational interventions for young children that “ability gaps” – or differences in children’s baseline knowledge and skills – are a primary cause for the achievement gap, begin at an early age, and cannot be mitigated by educational experiences after second grade (Heckman 2011).

Evidence from longitudinal studies of interventions like the Perry Preschool Project and the Abecedarian Project¹ suggest that early childhood education has the potential to reduce these ability gaps (and subsequently, the achievement gap) by permanently bolstering social and emotional skills (Schweinhart et al. 2005) as well as IQ (Heckman 2011, citing work by Campbell and colleagues). My nephew

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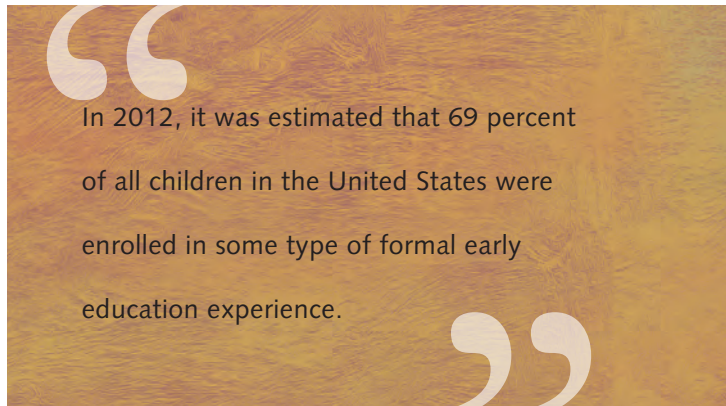
1 The HighScope Perry Preschool Study and the Carolina Abecedarian Project are two well-known early childhood education research studies that have tracked participants for over forty years and shown positive, long-term outcomes of high-quality early education, along a range of educational, social, and emotional indicators. For more information about the Abecedarian Project, see <http://abc.fpg.unc.edu/>; for the Perry Preschool project, see <http://www.highscope.org/Content.asp?ContentId=219>.

benefited from this body of research because it pointed the way to interventions that could improve his life and reduce the negative impact of his early deleterious experiences.

The body of literature on the importance of the first five years of life in shaping a child’s overall developmental trajectory, and on the effectiveness of ECE as an intervention for young children, has continued to grow. Until relatively recently, however, policymakers at the federal, state, and local level have been guided by the ethos that the family has primacy over a child’s care and learning experiences, particularly during his or her first five years of life. As a result, these policymakers have largely limited investment in services for young children to those children deemed “at-risk” in some way (e.g., Head Start), or to support families during times of crisis (e.g., the Lanham Act of 1941, with provisions for childcare services for mothers who entered the workforce during World War II) (Lombardi 2003).

In recent years, this history of targeted investments and limited government involvement in the lives and education of children under the age of six has begun to change. Over the past two decades, the need for more widespread ECE services increased as more women entered the workforce and needed care for their children during the workday. The increase in demand for services, coupled with the rapid pace of research on the benefits of ECE for young children’s learning and development, created a “perfect storm” of sorts among scholars and advocates in the field that led them to the conclusion that it was time to leverage these advances in knowledge and public will.

Beginning in the late 1990s, the field made a concerted effort to translate and promote the growing body of research on ECE to policymakers and business leaders. It was then that ECE began to emerge as a policy issue (Kagan &



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Gomez 2014), and more broad-based investment in ECE began to take place. Advocacy and media campaigns by various stakeholders were created in an effort to garner more widespread investment in ECE. Pre-K Now, for instance, was a ten-year campaign (from 2001 to 2011), funded by the Pew Charitable Trusts, designed to educate federal and state policymakers about the importance of investing in early education – specifically, in state and federally funded pre-K services.

Interest also grew on the part of state governments in investing in publicly funded preschool programs to meet the greater demand for childcare and early learning experiences. The percentage of children served by state-funded pre-K programs rose from 14 percent in 2002 to 29 percent in 2014 (Barnett et al. 2015). While still a modest increase, it represents many thousands of children gaining access to preschool programs. Enrollment in other types of ECE programs also grew. In 2012, for instance, it was estimated that a total of 69 percent of all children in the United States were enrolled in some type of formal early education experience (Organisation for Economic Cooperation and Development 2012). During this decade, major investments in ECE were also made internationally. Of forty-five countries surveyed by the Economist Intelligence Unit (2012), thirty-three provided access to ECE for over 50 percent of all their children.

ECE is still not universally embraced. Only a few states truly provide for universal pre-K, and no state invests in universal ECE services for infants and toddlers. But the zeitgeist has shifted among families, researchers, and policymakers about the importance of young children’s participation in education and care outside of the home. My family’s decision to enroll my nephew in ECE reflects this shift.

“HIGH-QUALITY ECE”: EVOLVING DEFINITIONS

My nephew had the opportunity to attend an ECE program accredited by NAEYC. Research has shown that children enrolled in high-quality programs tend to demonstrate better cognitive and social emotional outcomes in school than do their peers who did not have the benefit of a high-quality ECE program (Mashburn et al. 2008), and that they sustain those outcomes into the primary grades (Love et al. 2013). ECE experiences that are of high quality are what make the difference for young children over time, particularly for children with identified risk factors. But what constitutes “high quality” in an ECE program?

The definition of *high-quality* ECE long hinged on three baseline, structural factors: group size, adult-child ratios, and teacher qualifications (training and experience) (Vandell & Wolfe 2000). NIEER has embraced these three factors, along with seven other “benchmarks of quality” for the purpose of establishing a floor for quality in state-funded pre-K programs and ranking states according to the number of quality benchmarks reflected in policy (Barnett et al. 2015).

Our understanding of “quality” over the past decade has become more multifaceted, emphasizing the impor-

tance of teacher-child and peer interactions for young children’s learning, in addition to structural factors (LaParo et al. 2012). While additional research is needed, there is consensus in the field that quality is an essential ingredient to producing benefits for children’s learning and development (Camilli et al. 2010). What is less clear, however, is how to sustain those gains over time – something that I think about when considering my nephew’s learning trajectory over the next few years.

SUSTAINING GAINS: MOVING FROM PROGRAMS TO SYSTEMS

My nephew has continued to do well in school, but the research is not yet conclusive regarding to what extent the gains accorded to young children by high-quality ECE experiences can be sustained over time. Several studies of pre-K programs (Hillm, Gormley & Adelstein 2015; Lipsey et al. 2013; Puma et al. 2010) suggest that by grade 3, the benefits children gain by participating in quality ECE experiences fade out or converge with those of their peers that did not participate in those experiences. Other studies found that educational outcomes from pre-K programs were sustained through third grade (Muschkin, Ladd & Dodge 2015) and that the long-term effects of Head Start programs are manifest in children’s increased social and emotional competency (Love et al. 2013). Still other research findings suggest that quality acts as a “counterfactual condition,”² (p. 3) resulting in effects that differ between groups of children who attended a high-quality ECE program and those who did not (Feller et al. 2014, p. 3; also see Jenkins et al. 2015). Furthermore, dosage (i.e., the amount of time spent in an ECE program) appears to matter, as children enrolled in high-quality ECE programs

for between one to three years performed better over time than those enrolled in a program for less than one year (Nores & Barnett 2010).

Why Do ECE Benefits Tend to Fade by Third Grade?

There are multiple theories about why fade-out occurs, among them: high-quality elementary school experiences allow peers who did not attend ECE to catch up with their peers; the instructional quality in elementary school may be poor, and thus children have fewer chances to maintain what they have learned; and the instructional approach in elementary school is misaligned with that provided in ECE settings, triggering fade-out as a result of mismatch in content and instruction (Jenkins et al. 2015).

Research is being conducted to assess the validity of each of these theories, and hopefully, interventions can be designed to address potential challenges. Interventions in individual ECE programs and schools, however, are not the only areas in which work needs to take place to ensure that children – like my nephew – have the chance to capitalize on the knowledge, skills, and

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- 2 A counterfactual condition refers to a set of conditions in which a particular outcome results that is different from the outcome achieved when the conditions were similar but not exactly the same. Here, this refers to ECE settings, all of which can be said to be similar, but with varying differences in quality.
- 3 The “smart education systems” (SES) framework from the Annenberg Institute for School Reform at Brown University proposes a similar approach (see <http://annenberginstitute.org/who-we-are/smart-education-systems>). An SES is defined as a partnership between a high-functioning school district and local civic and community organizations that coordinates educational supports and services wherever they occur – at school, at home, and in the community – to provide all children with equitable opportunities and high-quality learning experiences.

experiences they have developed during their time in ECE programs. Work also needs to occur at the system level.

Ensuring Access, Quality, Alignment, and Continuity: The Need for a Systemic Approach

The broad-based recognition that ECE can impact children’s learning and development has resulted in increased enrollments and a proliferation of publicly and privately funded ECE programs. It has also created a patchwork of policies and fragmented administrative structures at the federal, state, and local levels. This fragmented infrastructure means that access to high-quality ECE programs for children and families varies tremendously depending on the state – and sometimes even the community – in which they live (Barnett et al. 2015). Inequities leading to potential fade-out of ECE benefits remain pervasive for children in all fifty states.

The response from some scholars has been to shift the unit of analysis from *programs to systems*. An ECE system can be defined as programs and services for young children and families plus the policies and administrative infrastructure that support those programs (Kagan & Kauerz 2012).³ ECE systems typically have seven elements:

- regulations articulating minimum requirements for safety and health;
- professional development supports for ECE professionals;
- financing;
- accountability measures ensuring programs meet fiscal and quality benchmarks;
- outreach to and engagement with families and communities;
- standards for early learning and development, programming, and professional preparation; and

- a coordinated approach to governance to manage each of the other six elements (Kagan & Kauerz 2012; Kagan & Cohen 1996).

The primary goal of a functional ECE system is to create the mechanisms for children and families to have greater access to high-quality ECE programs.

Still in its infancy, research on ECE systems is an important area of inquiry in the field, with implications for policymaking. Notable innovations in research and practice focus on the development of a P–3 early learning system, in which there is alignment not only among the policies and programs that address children from birth to age five, but also from birth through third grade (Kagan & Kauerz 2012).⁴ Many challenges arise from a lack of alignment among these policies and programs. For example, in many states and localities, there are few transition supports for children as they move from pre-K to kindergarten. Transition supports should not only include systematic methods of communication between pre-K and kindergarten teachers, but also an alignment of the standards, curriculum, and assessments in pre-K to kindergarten to ensure a continuum of developmentally appropriate teaching and learning (Kagan & Tarrant 2010).⁵ When my nephew, for example, transitioned from a privately owned ECE program into a kindergarten program in the public school system, there were no formalized opportunities for teacher communication, and the curricula in kindergarten looked very different from that of his pre-K program.

In addition to research on the importance of systemic supports during transitions, research on governance suggests that creating a coordinated state-level approach to governance of ECE/P–3 systems gives states the authority to foster greater alignment across the birth-to-grade-3 continuum,

implement systemic interventions that increase program quality,⁶ focus on enhanced supports to the ECE workforce, and explore durable options for financing ECE programs (Kagan & Gomez 2015; Gomez 2015; Regenstein 2015; Goffin, Martella & Coffman 2011). Several states, including Maryland, Pennsylvania, Massachusetts, and Washington have already implemented new approaches to governance aimed at aligning policies and infrastructure from birth through grade 3.

It is important to emphasize that a causal connection cannot be made between system development and improved child outcomes or sustained gains over time. However, research on systems indicates that system-level interventions increase the capacity of states to improve the supports to programs (Gomez 2015), which, in turn, could bolster the structural quality of those programs and, in some cases, the process quality as well (Tarrant & Huerta 2015). Furthermore, if a P–3 system focus is applied, state efforts can be directed to exploring alignment of early learning and development standards with K–12 standards, and the alignment of those standards with curriculum and assessments for children from birth through grade 3.

Research on systems underscore the need to address transitions in outreach and engagement systems, including systemic supports for

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- 4 I distinguish here between an ECE system, which typically focuses on birth through age 5, and a P–3 system, which focuses on birth through third grade.
- 5 For a description of a systemic approach led by a community advocacy organization in Tulsa, Oklahoma, that supports aligned transitions, see the article by Amy Fain and Diane Eason Contreras in this issue of *VUE*.
- 6 See the Quality Rating and Improvement System National Learning Network at <http://qrisnetwork.org/>.

vertical transitions (from ECE to public school settings, including pre-K to kindergarten); *horizontal* transitions (from home to school and from school to community settings); and *temporal* transitions (moving from activity to activity within the course of the day) (Kagan & Tarrant 2010). Another study that examined transitions from pre-K to kindergarten in Finland found that while many types of transition activities were beneficial to children, “co-operation over curricula and passing on written information about children between the preschool and the elementary school were the best predictors of the children’s skill” (Ahtola et al. 2011, p. 295).

These studies offer a prologue for thinking about the structure of a P–3 system that would increase access to high-quality ECE programs for all children and align those programs with the primary-level curriculum, instructional approaches, and assessments. This kind of high-quality, aligned P–3 system has the potential to support children in becoming healthy, socially competent lifelong learners.

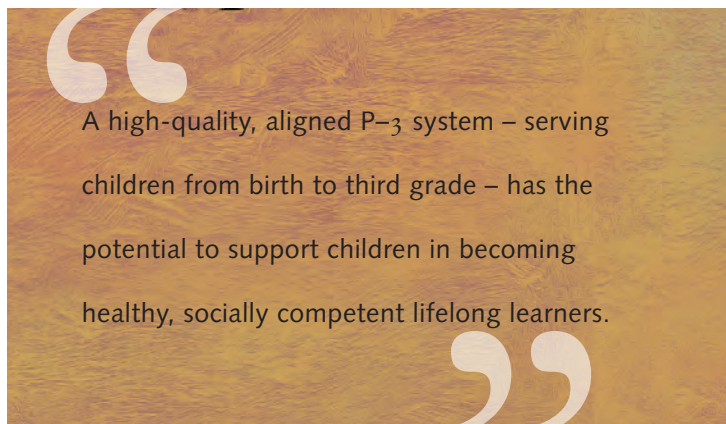
WHAT RESEARCH HAS YET TO ANSWER

I have highlighted here the areas of consensus in the research regarding the importance of high-quality ECE for supporting young children’s development and learning. Despite this consensus, there is still much to be explored. I have discussed the areas of intellectual and practical debate regarding the causes of fade-out and what can be done to mitigate fade-out effects, an important line of inquiry that must continue.

We have also yet to fully understand the influence of the ECE workforce on program quality and children’s learning, including the type and amount of professional development needed to

support high-quality teaching. Recently, the National Academies of Science released a report on the ECE workforce, which can serve as a basis for thinking about what types of investments in workforce supports are needed to contribute to program quality and boost children’s learning (Allen & Kelly 2015). The influence of family and community on children’s learning and the ability of these supportive factors to influence children’s learning over time is another area of investigation that shows promise.

The notion of ECE/P–3 systems as drivers of program quality is still fairly new; to date, no state has a fully implemented system (Kagan & Kauerz 2012). This makes research on ECE systems difficult to design and carry out. However, the past decade has done a great deal to advance the field’s thinking about a range of aspects of ECE; this work can and should be used as a springboard for continued research and policymaking.



A high-quality, aligned P–3 system – serving children from birth to third grade – has the potential to support children in becoming healthy, socially competent lifelong learners.

MUCH PROGRESS, MUCH STILL TO DO

More and more people are aware of the importance of the first five years of a child's life for his or her overall development in the early years and long-term benefits in school and life. Research continues on the critical factors in high-quality ECE programs that result in significant benefits for young children's success in school and beyond. Federal, state, and local investments in programs and systems are affording many more children access to high-quality ECE.

However, many children still do not have access to good programs that are accessible and affordable for their families. My nephew had the benefit of a strong family support system and a high-quality ECE program to help him succeed in school. However, he lives in a state where there is no publicly funded pre-K, nor is there even full-day kindergarten. This means that there are countless children in similar situations who do not have the opportunity to participate in high-quality ECE experiences, and this may affect their learning and development negatively over the long term. And despite increased recognition of the importance of early childhood education, the emerging research on the systems needed to scale up ECE programs and align them with K–3 systems has yet to be implemented in any major way. This decade of recognition has brought about much progress and knowledge about the influence of ECE on children's lives. But we can and we must do better.

For more on the National Institute for Early Education Research, see <http://nieer.org/>.

REFERENCES

- Ahtola, A., G. Silinskas, J. L. Poikonen, M. Kontoniemi, P. Niemi, and J. E. Nuruni. 2011. "Transition to Formal Schooling: Do Transition Practices Matter for Academic Performance?" *Early Childhood Research Quarterly* 26, no. 3:295–302.
- Ainsworth, M. D. S., and J. Bowlby. 1991. "An Ethological Approach to Personality Development," *American Psychologist* 46, no. 1:331–341.
- Allen, L., and B. B. Kelly. 2015. *Transforming the Workforce for Children Birth through Age 8: A Unifying Foundation*. Washington, DC: Institute of Medicine of the National Academy of Science.
- Barnett, W. S., M. E. Carolan, J. Squires, K. Clarke-Brown, and M. Horowitz. 2015. *The State of Preschool 2015: State Preschool Yearbook*. New Brunswick, NJ: National Institute for Early Education Research.
- Bronfenbrenner, U. 1986. "Ecology of the Family as a Context for Human Development: Research Perspectives," *Developmental Psychology* 22, no. 6:723–742.
- Camilli, G., S. Vargas, S. Ryan, and W. S. Barnett. 2010. "Meta-analysis of the Effects of Early Education Interventions on Cognitive and Social Development," *Teachers College Record* 112, no. 3:579–620.
- Center for the Study of Social Policy. 2009. *Protective Factors Literature Review: Early Care and Education Programs and the Prevention of Child Abuse and Neglect*. Washington, DC: CSSP.
- Economist Intelligence Unit. 2012. *Starting Well: Benchmarking Early Education across the World*. London, U.K.: *The Economist*.
- Feller, A., T. Grindal, L. Miratrix, and L. Page. 2014. "Compared to What? Variation in the Impacts of Early Childhood Education by Alternative Care-Type Settings." Working paper, available at <http://ssrn.com/abstract=2534811>.

- Goffin, S. G., J. Martella, and J. Coffman. 2011. *Vision to Practice: Setting a New Course for Early Childhood Governance*. Washington, DC: Goffin Strategy Group.
- Gomez, R. E. 2015. "Governance as a Lever for Bringing Coherence to ECE Systems: The Adaptive Capacities of Consolidated Approaches." In *Early Childhood Governance: Choices and Consequences*, edited by S. L. Kagan & R. E. Gomez. New York: Teachers College Press.
- Heckman, J. J. 2011. "Effective Early Childhood Development Strategies." In *The Pre-K Debates: Current Controversies and Issues*, edited by E. Zigler, W. S. Gilliam & W. S. Barnett. Baltimore, MD: Paul H. Brookes Publishing.
- Hillm, C. J., W. T. Gormley, and S. Adelstein, 2015. "Do the Short-term Effects of a High-quality Preschool Program Persist?" *Early Childhood Research Quarterly* 32, no. 3:60–79.
- Jenkins, J. M., T. W. Watts, K. Magnuson, D. Clemens, J. Sarama, C. B. Wolfe, and M. E. Spitler. 2015. "Preventing Preschool Fade Out through Instructional Intervention in Kindergarten and First Grade: A Working Paper." Irvine: University of California School of Education.
- Kagan, S. L., and N. E. Cohen, editors. 1996. *Reinventing Early Care and Education: A Vision for a Quality System*. San Francisco: Jossey-Bass.
- Kagan, S. L., and R. E. Gomez, editors. 2015. *Early Childhood Governance: Choices and Consequences*. New York: Teachers College Press.
- Kagan, S. L., and R. E. Gomez. 2014. "One, Two, Buckle my Shoe: Early Childhood Mathematics and Teacher Professional Development." In *Preparing Early Childhood Educators to Teach Math: Professional Development that Works*, edited by H. P. Ginsburg, M. Hyson, and T. A. Woods. Baltimore, MD: Paul H. Brookes Publishing.
- Kagan, S. L., and K. Kauerz. 2012. *Early Childhood Systems: Transforming Early Learning*. New York: Teachers College Press.
- Kagan, S. L., and K. Tarrant, editors. 2010. *Transitions for Young Children: Creating Connections across Early Childhood Systems*. Baltimore, MD: Paul H. Brookes Publishing.
- Karoly, L. A., M. R. Kilburn, and J. S. Cannon. 2005. *Early Childhood Interventions: Proven Results, Future Promise*. Santa Monica, CA: Rand Corporation.
- LaParo, K. M., A. C. Thomason, J. K. Lower, V. L. Kinter-Duffy, and D. L. Cassidy. 2012. "Examining the Definition and Measurement of Quality in Early Childhood Education: A Review of Studies Using the ECERS-R from 2003 to 2010," *Early Childhood Research and Practice* 14, no. 1, <http://ecrp.uiuc.edu/v14n1/laparo.html>.
- Lipsey, M. W., K. G. Hofer, N. Dong, D. C. Farran, and C. Bilbrey. 2013. *Evaluation of the Tennessee Voluntary Prekindergarten Program: Kindergarten and First Grade Follow-up Results from the Randomized Control Design*. Nashville, TN: Vanderbilt University, Peabody Research Institute.
- Lombardi, J. 2003. *Time To Care: Redesigning Child Care to Promote Education, Support Families, and Build Communities*. Philadelphia, PA: Temple University Press.
- Love, J. M., R. Chazan-Cohen, H., Raikes, H., and J. Brooks-Gunn. 2013. "What Makes a Difference: Early Head Start Evaluation Findings in a Developmental Context," *Monographs of the Society for Research in Child Development* 78, no. 1:vii–viii, 1–173.
- Mashburn A. J., R. C. Pianta, B. K. Hamre, J. T. Downer, O. A. Barbarin, D. Bryant, M. Burchinal, D. M. Early, and C. Howes. 2008. "Measures of Classroom Quality in Prekindergarten and Children's Development of Academic, Language, and Social Skills," *Child Development* 79, no. 3:732–49.

- Muschkin, C. G., H. F. Ladd, and K. A. Dodge. 2015. "Impact of North Carolina's Early Childhood Initiatives on Special Education Placements in Third Grade," *Educational Evaluation and Policy Analysis* 37, no. 4:478–500.
- Neugebauer, R. 2009. "Where Are We Headed with Accreditation?: Trends in Quality Assurance," *Child Care Exchange* 186:14-17.
- Nores, M., and W. S. Barnett. 2010. "Benefits of Early Childhood Interventions Across the World: (Under) Investing in the Very Young," *Economics of Education Review* 29, no. 2:271–282.
- Organisation for Economic Cooperation and Development. 2012. *United States – Country Note – Education at a Glance 2012: OECD Indicators*. Paris, France: OECD Publishing.
- Puma, M., S. Bell, R. Cook, and C. Heid. 2010. *Head Start Impact Study: Final Report*. Washington, DC: U.S. Department of Health and Human Services, Administration for Children and Families.
- Regenstein, E. 2015. "Glancing at Governance: The Contemporary Landscape." In *Early Childhood Governance: Choices and Consequences*, edited by S. L. Kagan and R. E. Gomez. New York: Teachers College Press.
- Schweinhart, L., J. Montie, Z. Xiang, W. S. Barnett, C. R. Belfield, and M. Nores. 2005. *Lifetime Effects: The HighScope Perry Preschool Study through Age 40*. Ypsilanti, MI: HighScope Press.
- Shonkoff, J. 2010. "Building a New Biodevelopmental Framework to Guide the Future of Early Childhood Policy," *Child Development* 81, no. 1:357–367.
- Shonkoff, J., and D. Phillips. 2000. *From Neurons to Neighborhoods: The Science of Early Childhood Development*. Washington, DC: National Academies Press.
- Tarrant, K., and L. A. Huerta. 2015. "Substantive or Symbolic Stars: Quality Rating and Improvement Systems through a New Institutional Lens," *Early Childhood Research Quarterly* 30:327–338.
- Vandell, D. L., and B. Wolfe. 2000. *Child Care Quality: Does It Matter and Does It Need to Be Improved?* Madison: Institute for Research on Poverty, University of Wisconsin.