

Sustaining Early Childhood Learning Gains

Program, School, and Family Influences

Edited by

Arthur J. Reynolds

University of Minnesota

Judy A. Temple

University of Minnesota

To Cite:

Ramey, C.T., & Ramey, S.L. (April 2019). Reframing policy and practice deliberations: Twelve hallmarks of strategies to attain and sustain early childhood gains. In A.J. Reynolds, J.A. Temple (Eds.). *Sustaining early childhood learning gains: Program, school, and family influences* (pp. 314-349). United Kingdom: Cambridge University Press.



CAMBRIDGE
UNIVERSITY PRESS

CAMBRIDGE UNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom

One Liberty Plaza, 20th Floor, New York, NY 10006, USA

477 Williamstown Road, Port Melbourne, VIC 3207, Australia

314–321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre,
New Delhi – 110025, India

79 Anson Road, #06–04/06, Singapore 079906

Cambridge University Press is part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of education, learning, and research at the highest international levels of excellence.

www.cambridge.org

Information on this title: www.cambridge.org/9781108425926

DOI: 10.1017/9781108349352

© Cambridge University Press 2019

This publication is in copyright. Subject to statutory exception and to the provisions of relevant collective licensing agreements, no reproduction of any part may take place without the written permission of Cambridge University Press.

First published 2019

Printed and bound in Great Britain by Clays Ltd, Elcograf S.p.A.

A catalogue record for this publication is available from the British Library.

Library of Congress Cataloging-in-Publication Data

Names: Reynolds, Arthur J., editor. | Temple, Judy A., editor.

Title: Sustaining early childhood learning gains : program, school, and family influences / edited by Arthur J. Reynolds and Judy A. Temple.

Description: Cambridge ; New York, NY : Cambridge University Press, 2019. | "The book is based on a national invitational conference that was held at the Federal Reserve Bank of Minneapolis in October 2015. The chapters are updated versions of those presented at the conference" – Chapter 1. | Includes bibliographic references and index.

Identifiers: LCCN 2018039866 | ISBN 9781108425926 (hbk.)

Subjects: LCSH: Early childhood education – Evaluation. | Early childhood education – Planning.

Classification: LCC LB1139.25 .S87 2019 | DDC 372.21–dc23

LC record available at <https://lcn.loc.gov/2018039866>

ISBN 978-1-108-42592-6 Hardback

Cambridge University Press has no responsibility for the persistence or accuracy of URLs for external or third-party internet websites referred to in this publication and does not guarantee that any content on such websites is, or will remain, accurate or appropriate.

15 Reframing Policy and Practice Deliberations

Twelve Hallmarks of Strategies to Attain and Sustain Early Childhood Gains

Craig T. Ramey and Sharon Landesman Ramey

Early education experiments have produced varied outcomes. The “classic” long-term studies, as well as more recent studies, affirm many practical benefits that extend into elementary school – most consistently, reductions in grade repetition and special education placement – and result in healthier, more productive adult lives. Despite decades of thoughtful critique, the myth of a fade-out effect persists. We conclude that when early education yields large and enduring effects, this likely is the result of both (1) building a robust early learning foundation via high-quality and sufficient dosage supports in the first five years of life and (2) affording reasonably strong subsequent educational, family, and/or community experiences. This is because human competence and neuroplasticity benefit from cognitive, social, and health opportunities across the lifespan.

In this chapter, we reflect on our 40+ years of experience in this field – from directly designing and implementing randomized controlled trials of multiple types of center-based early care and education programs as well as home visiting programs to advising and often reviewing and evaluating large-scale community, state, national, and international programs. We propose a set of hallmarks that we think distinguish the majority of programs that produced large magnitude and multiple life-course (and intergenerational) benefits. We hope these hallmarks will contribute to a reframing of policy and practice deliberations, resulting in a far greater consensus about how our communities can realistically and promptly reduce the large and burdensome educational inequalities and health disparities that continue to plague our nation’s lowest income and most marginalized children and families. The great divide within the USA, if not effectively curbed, will lessen the future for our democracy and will be a blight on all citizens and communities.

Background to Understanding Successful Life-Course Studies

The first set of pioneering early education experiments launched in the 1960s answered the question, “Can children born into poverty benefit from educational enrichment prior to entering school?” with a resounding “Yes” (Lazar et al., 1982; C. Ramey, 1982). These social experiments, fueled by humanitarian concerns about poverty and racism, also addressed the basic science question: “Can children’s cognitive performance be improved by altering early experience?” Collectively, these studies challenged the widely accepted, but untested assumption undergirding the creation of standardized intelligence tests – namely, that intelligence was a fixed, innate trait. At the same time, these experiments incorporated new ideas derived from the fields of ethology and comparative psychology that yielded provocative findings about how profoundly learning (in birds, ducks, dogs, mice, rats, and monkeys) could be altered by manipulating early environments and early experiences.

The findings from the first set of 13 human experiments yielded both short- and longer-term data, rigorously and repeatedly analyzed and summarized through a peer-reviewed, consensus-building process. For scholars of early childhood development, the resulting 1982 monograph published by the Society for Research in Child Development served as a landmark publication. Remarkably, in the broader arena of early childhood education, the findings from more than three decades ago often are forgotten, misinterpreted, or discounted as being “back then” and “when our country was a lot different.” There has been a vigorous and thoughtful second phase (in the 1970s and 1980s) and then a third phase (in the 1990s and the first decade of the 2000s) concerning scale-up, community-based, and even national projects. Yet we begin this chapter by reprinting the original full abstract (Box 15.1, next page) that summarizes what was concluded in the early 1980s. Of particular note, the effects applied widely to different subgroups of children and the benefits were *not* limited to a single or narrow cognitive outcome. Simply stated, and directly quoted, “Results showed that early education programs for children from low-income families had long-lasting effects in four areas: school competence, developed abilities, children’s attitudes and values, and impact on family.”

Box. 15.1

Abstract

This collaborative study assessed the long-term effects of early childhood education experience on children from low-income families. In 1976, 12 investigators, who had independently designed and implemented infant and preschool programs in the 1960s, pooled their original data and conducted a collaborative follow-up of the original subjects, who were aged 9–19 at the time. Coordination of data collection and joint analyses were supervised by two additional investigators. The multisample secondary analyses reported here addressed two general questions: Were there long-term effects of early childhood programs? Were programs more effective for some subgroups of the low-income population than for others?

Outcome measures included indicators of school competence (special education assignment and grade retention), developed abilities (standardized intelligence and achievement tests), children's attitudes and values, and impact on the family. Each early childhood project was considered separately for each hypothesis test and the results of the separate hypothesis tests were pooled using a pooled-z technique. This procedure tested the null hypothesis that there was no average effect of program participation across the different early education programs. Detailed attrition analyses indicated that attrition was essentially random, introducing no noticeable biases into the data analyses.

Results show that early education programs for children from low-income families had long-lasting effects in four areas: school competence, developed abilities, children's attitudes and values, and impact on the family. 1. Children who attended programs were significantly more likely to meet their school's basic requirements. Controlling for family background factors and initial ability, program graduates were significantly less likely to be assigned to special education classes and less likely to be retained in grade than were controls. The effect apparently operated for all the children regardless of sex, ethnic background, initial ability level, or early family background factors. 2. Children who attended early childhood programs surpassed their controls on the Stanford-Binet intelligence test for several years after the program had ended. There was no evidence that the programs differentially raised the IQ test scores of some subgroups of children (differing on sex, initial ability, and family background). There was some indication that program graduates performed better on achievement tests than did controls. 3. In 1976, children who had attended early education programs were significantly more likely than were controls to give achievement-related reasons, such as school or work accomplishments, for being proud of themselves. Older program graduates also rated their school performance significantly better than did controls. 4.

Program participation also affected maternal attitudes toward school performance and vocational aspirations relative to those of the child. The school competence results are placed in a larger developmental context through exploration of two empirically derived paths from program participation to increased school competence. The educational, social, and economic significance of the results are discussed and implications for social policy are detailed.

(Lazar et al., 1982)

The socially valued and economically impactful outcome of making satisfactory school progress – including on-time grade promotion and not being placed in special education – appeared across almost all of the projects. The finding of enduring effects was repeatedly affirmed through rigorous experiments that were launched later (including the Abecedarian Project, Project CARE, and the Infant Health and Development Program [cf. Ramey, 2018]) and the large-scale community-based Chicago Parent–Child Centers (e.g., Reynolds, 2000; Reynolds, Temple & Ou, 2010). Similarly, substantial investments in conducting far more sophisticated and nuanced reviews and data analyses of even longer-term outcomes (concentrated primarily on the Perry Preschool Project, e.g., Schweinhart & Weikart, 1983; Heckman et al., 2010; the Abecedarian Project and its replication, Project CARE; and The Chicago Child–Parent Centers) endorse their value (e.g., Camilli et al., 2010; Dodge, 2017; Kay & Pennucci, 2014).

Yet surprisingly, what is all too often remembered from the first and second wave of early educational studies is that there was a “fade-out effect.” The source of this misrepresentation of findings from both the early and subsequent studies, concerns primarily IQ scores. Specifically, the largest group differences on IQ scores between children who did and did not receive the experimental high-quality early education tended to be largest when the learning experiences were the most different between the experimental and control children. When control children in some studies received either high-quality community center-based care or when they entered high-quality public schools, their IQ scores increased, thus lowering the magnitude of significant group differences.

In contrast to the IQ outcome data, however, the practical academic benefits detected in terms of children’s later reading and math achievement, lower grade repetition, and lowered special education placement rates remained strong (C. Ramey et al., 2000; Schweinhart et al., 2005). (For excellent reviews of “the myth of fade-out” and plausible reasons for declining group differences over time, see Barnett, 2004, 2014.) Even more impressively, a number of important adulthood benefits later emerged, including a variety of post-secondary educational and employment or income outcomes, and positive health indicators (e.g., C. Ramey et al., 2000; Campbell et al., 2002; Campbell et al., 2014). Further, high-quality public education *does* improve academic outcomes for children who enter kindergarten well below national average, so children in comparison groups often show significant early gains that contribute to smaller effect sizes than occurred during the younger years (e.g., S. Ramey et al., 2001). Even well-documented critiques of the fade-out effect (e.g., Barnett, 2014) have failed to dispel this belief.

In this chapter, we suggest that continuing to debate about the variations in long-term benefits and economic yield measured as “return-on-investments” (or cost savings to society by preventing negative outcomes) will be less productive and relevant for policy and practice than developing a new broadened paradigm that confronts the immediate consequences of permitting huge disparities to grow in the first decade of children’s lives. We present a two-stage hypothesis, informed by our firsthand experiences of developing programs, conducting research, and reflecting on the findings from longitudinal studies of children born into entrenched poverty and extremely challenging life conditions.

The *first part of the hypothesis* is that **early life supports – both within and outside the family – must reach a threshold of high-quality and dosage to build a solid developmental foundation for later success in school, good health, and productivity in adulthood.** Accordingly, careful attention to the *multiple features* of those interventions that have produced both large short-term and later multiple long-term benefits is warranted. These features can inform efforts to design, improve, and coordinate current programs and community supports across a broad array of funding and administrative mechanisms; and may facilitate designing and implementing practically useful data collection, analysis, and reporting plans to maximize the likelihood that all children realize a strong early educational and health foundation.

The *second part of the hypothesis* is that **lifelong benefits of a strong early foundation in learning and health depend on what happens next** (C. Ramey & Ramey, 1998). That is, children need to have continuities in positive environments as they progress into next-stage educational, social, recreational, and creative endeavors. The conclusion that effective early education alone is not sufficient to guarantee success in life and health does *not* lessen the centrality or urgency of providing these early opportunities for all children, particularly those most vulnerable due to life circumstances when they were born. Rather, this recognizes basic principles of human learning and well-being, such that children (and their families, schools, and communities) continue to need strong supports to maintain good rates of learning and positive health and engagement in healthy activities. Fortunately, there is substantial evidence that high-intensity, theory-driven, carefully measured and monitored interventions – early and across the lifespan – can produce “gains” that do not fade, but rather well prepare children to realize the benefits of our major societal institutions and public programs.

Policy deliberations need to move beyond the limited and competitive debate about “early” education being the *only*, the *best*, or the *better time* to

invest in children. This is not because the preponderance of evidence does not support this (e.g., Dodge, 2017). Rather, it is time to recognize the limits of the available data and analytic approaches and to confront the reality that children's well-being necessitates a 24/7, year-round, multi-year understanding of human development. We anticipate that a truly adequate inventory of the similarities and differences among children's daily realities – from this broadened perspective – will be critical to inform how we can best propel academic and social competence, health, and hope among our nation's most vulnerable children, starting early and then extending through adulthood in ways that build upon existing resources and scientific knowledge.

To the extent that we can create new broadened alliances that seek to conjoin improvements in education (pre-K through 12 plus higher education and vocational preparation) and parenting supports that extend far beyond the preschool years are likely to be productive, efficient, and endorsed by the general public. When education and positive environments for young children are “sold” to legislators and the business community primarily based on an economic model, this may have an unintended effect of reducing poor children and their families to commodities that are viewed as potential societal burdens, rather than accepting all children as integral to our larger communities and the future of our democracy. If investors do not “make money” on their bets in favor of these children being placed in evidence-based programs, then should we cease to provide early high-quality caring, educationally enriched, and socially integrated opportunities for these children? At the same time, we cannot ignore the fact that the economic return-on-investment, coupled with evidence that poor quality (“toxic”) environments harm children's brain development, has captivated and stimulated many to take constructive actions within their communities.

The paradigm we advance is one that expands to consider group-level and societal human capital benefits (that is, beyond just measuring gains for the at-risk children) associated with providing early learning and health supports for all children. Similarly, we endorse the view that early supports and programs for all children (not just those at risk) should meet high standards that link to research evidence and that can be readily understood, valued, and measured (evaluated) by families and providers as well as scientists, administrators, and funding agencies.

Our reflections on the history and findings of a large body of research and program evaluation have led us to identify “hallmarks” of the most impactful projects. These hallmarks, somewhat surprisingly, do not necessarily drive up the cost of providing effective supports early in life, but they do require high levels of transparency, engagement of diverse

sectors within our communities, and a bold willingness to take timely actions when children or families are in harm's way or when services and programs are below a quality and intensity threshold needed to support healthy growth and development. We present this list of hallmarks here to stimulate discussion so they can be further refined and incorporated into implementable policies and practices. These hallmarks may help provide a template to maximize the current and planned future investments in early childhood care and education initiatives – that is, these focus on the first part of our hypothesis: that high-quality early care and education are vital, but not necessarily sufficient, for later long-term success.

Part One: Hallmarks of Successful Programs that Improved the Lives of Vulnerable Children

The programs that produced enduring benefits have served as beacons and inspiration for launching many other efforts. They also have provided the data that economists use to estimate costs (often adjusted for operating in today's world) and their savings to society, measured in economic and human capital terms. Many of these proven programs served as the basis for designing newer studies that incorporate cutting-edge neuroscience methods to discover whether children's biology and particularly their brains are changed, and if so, in what ways and how much, as a result of participating in these types of programs. These programs are rightly celebrated for the exciting news and hope they bring to society.

Yet the good news is not met with uniform enthusiasm. To the contrary, the attacks on these “proven programs” have been vigorous and sustained; and skepticism abounds about whether these programs can be trusted to illuminate the pathways to improve the ways we choose to nurture and to educate our children, individually and collectively. The insider story of how these programs operated is often skipped over when sharing the good news. In this reflective chapter, we try to go behind the scenes and include ideas from those who led some of these programs.

The “Hothouse” versus the “Real World” Controversy: What This is All About

What are the attacks on these successful programs? Why so much pessimism? The most frequent attack on the well-known successful research programs is: *The positive results were obtained only under “hothouse” conditions.* The “hothouse experiments” accusation refers to the appearance that these projects operated under “ideal circumstances,” in a rarified and protected environment, like a hothouse where the gardener can control all

of the crucial conditions for growing plants. This controlled environment frees the gardener from dealing with the many uncertain whims of Mother Nature. Thus, by analogy, the gardener who succeeds in a hothouse may *not* achieve the same success in “the real world” of ordinary gardens. These references to hothouse conditions are usually accompanied with warnings to policymakers, politicians, administrators, practitioners, parents, and the general public: “Be careful. Do not think you can achieve the same results in your own communities (gardens)!”

A twist on the hothouse attack is the not-infrequent claim that the successful early childhood programs were “boutique programs.” For those of us who designed and operated programs that served children with very challenging life conditions, we can assure the public that boutique is not an adjective that would readily come to mind for anyone who worked in or visited our early childhood programs. The term boutique makes it seem that what we did with and for these children and families was so elite and so out-of-reach that ordinary programs could never achieve the same conditions and thus could never yield equal benefits. Boutique also implies very expensive, and many of today’s community-based, publicly funded programs cost as much, or even more, than the proven programs did, even adjusting for inflation.

The expression “the real world” is shorthand for the morass of conditions providers and policymakers face as they decide what to do with and for children. “Real world” equates with complicated, out-of-control, overwhelming, unpredictable, resistant to change, vulnerable to fads, and often demoralizing. The “real world” often is used to explain, and offered as an excuse for, the abysmal state of services and supports for children and families in many places.

Many of our colleagues who led the successful early childhood programs would vigorously reject the claim that they worked in an ideal environment. They faced many serious operational problems, as well as threats that could have derailed their programs. Yet we think it is fair to acknowledge that the landmark studies were relatively small in scale, had reasonable levels of funding, and were mostly under the direct control of those who designed them. Without doubt, we consider these to be fortunate and desirable conditions; ones that probably helped to spare these programs from many of the daunting problems others often face when they operate within complex and large health, education, and social service delivery systems. So, taking the hothouse criticism to heart, we decided to ask, “What did these highly successful programs have working in their favor?”

The Search for Common Features of the Proven Programs: How to Detect These and How to Estimate the Magnitude of Their Importance?

To generate our preliminary list of hallmarks of successful programs, we first considered the same list of 20 programs reviewed by the RAND Corporation, focusing on the 15 that produced substantial evidence of lasting benefits. We have known many of the leaders of these programs, we have reviewed their scientific articles, read their program descriptions, and in various ways served as advisers and colleagues working together and frequently sharing what we have been learning. Some of the features we identify here include ones that were seldom written about in the scientific peer-reviewed publications about the programs. Thus, we cannot assert with absolute confidence that these hallmarks are decidedly the *only* factors that mattered, nor do we think that *every* successful program had *all* of these features. What we have reflected on is the plausibility that this combination of positive features contributed in a major way to the high quality, the consistency, and the measured success of the program. In the final analysis, we have difficulty imagining how the programs could have been launched and fully implemented so well if these features had not been present; these “hallmarks” appear to us to have operated in a synergistic fashion from the earliest stages of the program through all phases of operation and evaluation. We present this list in the spirit of capturing our best insights from our decades of experience – a list that captures what we consider instrumentally invaluable in launching and sustaining high quality, effective programs to benefit children. The programs have spanned the arenas of health, education, and social services, children of different ages and with widely varying needs, often children of single teen mothers, children of color, and children whose families had very limited resources and whose parents had inadequate educational experiences and opportunities.

The Nominated Hallmarks of Programs that Improved Children's Lives

We propose in Table 15.1 a set of “hallmarks” as distinctive characteristics that likely contributed to the success of many of the childhood intervention research programs that produced significant gains. Of particular salience is that these hallmarks seem to work as a set – in ways that provide natural feedback mechanisms and help to make the whole – the program being implemented – more than just the sum of its parts. Accordingly, we suggest that communities, policymakers, leaders,

Table 15.1 *Hallmarks of early childhood education programs that produced large benefits*

-
1. Leadership at the highest level was stable, highly engaged, and deeply knowledgeable about the content of the program. Program leaders had a strong professional stake in the conduct of the project.
 2. The content of the programs was based on existing scientific findings and scientific theory about children's development, rather than ideology or philosophy alone.
 3. The programs were relatively intensive – often engaging program children and/or family members over a fairly long period of time. Although program dosage is extremely difficult to equate across different types of programs for different types of children and families, in general higher intensity programs tend to yield greater benefits.
 4. Multiple features and components were specified in the program to achieve maximum desired experiences for children, along with flexibility for intended individualization of the standardized protocol. That is, children's intertwined development and needs were recognized; this usually necessitated engagement of experts from diverse disciplines and specialty areas.
 5. Before the program was implemented, it was supported by both external peer review (content experts) and by respected members or opinion leaders in the local community (local endorsement).
 6. Program staff received strong training and professional development related to the intervention, and this included provision of active, ongoing supports and systematic supervision with feedback.
 7. Implementation of the program was actively monitored by leaders, which helped to detect and resolve problems early as well as to reward staff. Performance expectations were clear to staff, as well as the immediate goals for improving children's education and health outcomes.
 8. High levels of participation among all children and families were strongly supported from the very beginning and at all stages, including strategic plans to overcome the most likely potential barriers to full participation (e.g., transportation, illness policies, hours of operation, program schedule).
 9. Children's progress was frequently assessed by objective and unbiased methods, and valued as vital to understanding whether the program was able to achieve its intended benefits on children's lives. Evaluation was viewed as something that was "externally imposed," or something that was intrusive or competed with program resources for children.
 10. The information gathered about the program and about children's progress was analyzed and reported to both the program leadership team and to external groups, as appropriate, including presentation at leading professional organizations.
 11. Program developers recognized that replication of the program would be an important next step if the results affirmed benefits to children and families. Thus, the program's content and procedures were documented sufficiently to allow replication.
 12. The leadership had sufficient levels of resources and direct control over expenditures so that the key components of the planned program would be delivered, while knowing that they could rapidly make adjustments if and when problems occurred. The scale of these programs was small to moderate, and there was a good perceived match between resources available and the expectations for implementation.
-

direct providers, and parents consider how to maximize these hallmarks in their own efforts to increase children's school readiness and set the stage for enduring benefits.

These distinctive features also worked in a synergistic fashion. That is, each of these hallmarks received ongoing support from the presence of one or more of the other hallmarks. We elaborate in greater detail below.

1. Leaders had a strong professional stake in the conduct of the project. The leadership was present from the earliest stages of the program, a necessity since the people who led these projects were the originators of the ideas for the program and usually the ones who had to find the funds to conduct it. Sometimes external forces and opportunities encouraged the development of the program, but the compelling force behind and throughout these programs was the leadership. The individuals who led these programs were immersed in the content areas about human development addressed in their programs. They led the conceptualization and design of the program. In the world of science, they are designated Principal Investigators or Project Directors. Some had a history of working directly with children earlier in their careers, as teachers or clinicians or program administrators; others had firsthand experience observing and testing children in laboratory and community settings. Not all were experienced in leading large or complex projects when they began; neither were they all charismatic, singularly focused, or well-connected to influential people in the world of child and family policy. We can find little in common with their leadership style per se across these programs; rather, what surfaced was *their depth of commitment and knowledge about the theme or content of the intervention*.

In obvious ways, people who think of a new strategy to improve children's lives are highly invested in testing their ideas. They tend to be optimists, to the extent that they believe that meaningful change can occur, even in the lives of children and families facing serious life challenges. These programs – because they were in some ways original and not yet proven when they were launched – had to operate within the boundaries of science and its concomitant standards of proof. This meant that the leaders were constantly under scrutiny with multiple checks and balances used to yield what others would consider to be a fair or unbiased test of the program's impact on children's lives.

At the same time, these projects were exciting in their own right. The teams who worked together almost always included a mix of senior colleagues, graduate students and post-doctoral fellows, and experienced practitioners, as well as the new staff hired for the programs. There is little doubt these program leaders were active advocates for their programs.

Although they were hopeful, they did not claim success or promise benefits *before* the evidence came in. Indeed, excessive early claims can be the death of a scientific career.

2. The successful programs were guided by both existing scientific findings and scientific theory about children's development, rather than ideology or philosophy alone. The successful programs focused on changing specified aspects of a child's experiences that were highly likely to be important, based on findings from careful observational studies, from laboratory research with children, or from smaller (preliminary) studies that included at least some of the components of the final program that was implemented. These programs had a conceptual framework in which the rationale for the content of the program was described and defended. Sometimes the program added particular types of experiences to a child's life; sometimes it shielded the child from exposure to harmful experiences; sometimes the program changed the child's physical environment and health care to promote positive encounters and provide opportunities that otherwise were not as likely to occur, as well as to reduce or eliminate known environmental risks. The ideas guiding the program design – the package of services and activities that comprised the intervention, the treatment, or the prevention program – were formulated as scientific hypotheses about the ways that the components of the program would alter the process of human development. The hypothesized alterations in a child and family's life were then predicted to result in measurable changes in the short term, sometimes during the period that program was being provided, always at the end of the program, and often in the years after the child and family completed participation. This use of scientific findings and a guiding theory about children's developmental pathways was not just an academic exercise. To the contrary, this theoretical framework helped to shape the program itself. In all cases, these successful programs had a target group of children and families in mind when they were planned. Most of the programs concentrated primarily on directly changing the child's experiences – that is, the program actually provided specified learning experiences, types of interactional supports, and environmental opportunities to the children. Other programs, however, focused on changing the child's family first (such as home visiting and parenting programs) with the hypothesis that this would lead to changed opportunities and learning experiences to the children. Many programs had a theory that children would benefit from direct provision of certain experiences and these benefits would be better maintained if the child's family became better informed and more skillful in promoting their children's academic, social, and emotional development.

This conclusion that a scientific theory is an integral and important feature of the successful programs is one that many review panels have identified as well. In the landmark National Academies of Science report, *From Neurons to Neighborhoods* (Shonkoff & Phillips, 2000), the committee concluded that *every successful intervention was guided by a theoretical model with specification of the relationships between the stated goals of the intervention and the strategic approaches implemented to achieve these goals*. This strong consensus that theory matters brings currency to the words of Kurt Lewin, a highly innovative thinker in psychology and the founder of modern social psychology and what became known as “action research”: Lewin (1951) promoted the idea that “There is nothing so practical as a good theory.” He also admonished: “If you want to truly understand something, try to change it.”

Most parents, teachers, and practitioners do not think in terms of formal theories about human development and life-course developmental trajectories in any detailed way when it comes to their everyday care, nurturance, and instruction of children. Many of these important people in children’s lives do, however, have their own personal philosophies and their strong belief systems about children’s “true nature” and how best to help a young child become a mature, healthy, responsible adult. Although strong differences of opinion exist about how much parents or anyone else can really influence a child (particularly when it comes to the topic of what area and when in the child’s life the adult is trying to have an influence), there is almost universal agreement about some things that are harmful. But is there really an important difference between a philosophy and a scientific theory when it comes to children?

We argue strongly that there is a difference. A scientific theory is a formal set of ideas that are explicitly described and inter-connected, with linkages to objective data (evidence) about the phenomenon (the phenomenon here being the child’s development). There is a rich and fascinating field known as the philosophy of science; most scientists view theories as representing a highly evolved and elevated form of scientific reasoning. Then there are smaller theories or detailed elaborations of portions of major theories. Most human developmental scientists today are more modest in describing their ideas and prefer to use the expression “conceptual frameworks,” rather than theory, to describe their layout of key ideas about the factors that contribute to and shape a child’s life. Over time, these conceptual frameworks are refined, as more data become available and lend support to some ideas, but not others, and as unanticipated relationships emerge. These conceptual frameworks thus become increasingly specified about causality or something called multi-determinism that posits there are mutually interacting, dynamic sets of

probabilities that exert influences upon a child's development. (Science-speak is seldom easily understood; we will not try to defend ourselves or our colleagues for this occupational habit, but we will acknowledge that for many life scientists, each word or phrase they use has evolved through years of thinking, research, and re-formulation). Because so many of the terms scientists use also have an everyday connotation, there often is confusion about whether something is being used in the highly technical sense or the everyday sense. Examples of such confusion include terms related to areas such as: parent-child attachment, play, direct instruction, memory, emotions and feelings, intelligence, and personality. Scientific theories about human development are considered strong when they are highly specified in terms of how the different elements work individually and in combined ways with other elements, over time, and across settings – with these elements often changing in dynamic ways based on the engagement levels and the responses of a child. Scientific theories are designed so that they can be tested through research; thus, a theory – usually specified parts of a theory – can be proven wrong. In contrast, most philosophies and ideologies about children are judged largely by whether they seem to be logical, to match one's own experiences, or to be compatible with one's values and other belief systems about the world. Many philosophies are not organized so they can be disproved with evidence, or refined and improved based on facts that are collected about it.

In general, a philosophy or ideology is more similar to a world view than it is to a formal scientific theory. There are, of course, people who consider the life sciences as having their origins in philosophy and identify implicit assumptions about human nature that seem ideological. Historically, the philosophies and ideologies about human nature, in its individual and collective form, have garnered far greater sway than have scientific theories when it comes to societal decisions about taking care of and educating our children. (In all fairness, scientific theories about children are much newer; fewer people have studied them in depth; and for many, science represents something cold, distant, abstract, and very complex mathematically). A philosophy usually starts with some sweeping basic assumptions about the inherent nature of "man" (who first appears as a child) and then progresses to describe the ways in which children learn and become transformed into more or less competent and caring individuals.

A brief skip through some influential Western philosophers reminds us how different these basic assumptions can be. Consider John Locke, Thomas Hobbs, and Jean Jacques Rousseau. John Locke believed that a child was born as a blank slate (*tabula rasa*) and that experience would

fill that slate. Locke did not believe man was fundamentally good or bad. Thomas Hobbs was the world's pessimist about man's basic nature: he proclaimed that human nature – when left alone – would result in a life that was predominately “solitary, poor, nasty, brutish, and short.” The only way to escape would be to enter into mutually beneficial social contracts. So he saw some hope through external conditions. Rousseau had an idealist's view of man at birth – fundamentally pure and without sin, and only later lowered into a more beastly existence by a corrupt society. (By the way, Rousseau did not stick with this one view throughout his whole life.) These famous philosophers reflect starkly different views, generated in an era when there was little science about human beings in the early years of life or about which life experiences led to various adult outcomes. The debate about what mankind's true nature is – *independent* of the social and political environments where all human beings live – seems a bit preposterous to us. (It has captivated many, though, through the centuries.) The fact is, children cannot survive alone – and just thinking about this in the abstract, without empirical evidence, is unlikely to resolve the old philosophical debates. Even the tragic cases of children abandoned or reared in extremely isolated situations can hardly be considered proof about “man (woman) in his (her) natural state.” In other words, babies need a social world – their species-specific and species-typical environments – to both survive in the short term and then to learn over time those behaviors and ways of thinking and reasoning that will allow later survival and reproduction.

Educators and the practice of education also have long been guided by various philosophies. Among the popular educational philosophies that have influenced children's early education are those put forward by John Dewey, Maria Montessori, Rudolf Steiner, and parents in the villages around Reggio Emilia in Italy. These philosophies can be highly inspirational for teachers, and often are associated with certain practices that have appeared to create positive learning environments for young children. These philosophies tend to be accepted as a matter of belief and faith by the teachers who follow them. Rarely are these philosophical assumptions ever tested, but we think there would be great merit in more rigorous scientific study to understand how the philosophies are used to inform the practices of teachers and how these practices then contribute to children's courses of development. We note that scientific theory about child development could be related directly to educational philosophies and practices, but this happens only rarely. We do not consider that philosophies and theories are inherently at odds or in competition. In fact, we think it is interesting that we have identified the use of scientific theory as a hallmark of the successful programs for

children – and that many parents and practitioners strongly endorse the use of a particular philosophy to guide an educational program for children!

The use of scientific theory helps to establish a clear and practical guide for a program. The theory results in the program being *highly intentional* – focused in a well-thought-out way – in terms of what it does. The theory also helps to foster good communication in planning, implementing, monitoring, and evaluating the program. There is a “big picture” with a common language of defined terms that correspond to the key aspects of the program. *This big picture and shared vocabulary of a theory go hand-in-hand with detailed explanations (a strong rationale) as to why key aspects of the program are likely to make a difference in the lives of participating children.* It is not just a vague idea that loving children and playing with them and teaching them will guarantee they grow up to be caring and smart adults, although nothing is wrong at all with love, play, or teaching per se. To the contrary, these *are* good things in a child’s life. A theory would translate big concepts like love, play, and teaching into very clear dimensions as to what are the likely good ways of expressing love, playing with children, and teaching them – at different times in their lives. These words would not be used in ways that left it up to each parent or teacher or therapist with his or her own ideas about how to love, play, and teach children. What if an infant-toddler teacher thought that “tough love” is a very good kind of love, and then decided to start showing love by never “giving in” and never responding to a 4-month-old baby when crying in distress or trying to get the teacher’s attention by making sounds, smiling, or moving his or her arms and legs? What if a child care provider believed that playing with a 2-year-old meant simply letting the child do anything and everything with absolutely no adult interference, no guidance, and no comments at all? Or what if a preschool teacher thought that teaching a 3-year-old in ways to help prepare the child for academic achievement in elementary school involved demanding that the child remain still, quiet, and totally attentive before any instruction begins, and that an effective method for teaching a very young child to try new skills involved immediate, sharp punishment every time the child does not follow (obey) what the adults asks (teaches) or every time the child makes a mistake? When a theory-based program for children emphasizes activities like responsive care (or love), exploration and natural play, and instruction that is appropriate for a child’s age and stage of development, it is not just a matter of opinion for everyone to imagine how to express these qualities. In fact, the examples of how some adults show love, play with children, and teach children that we mentioned above are not made up or extreme examples – these examples are real ways that many well-intentioned adults we have

met and observed have shown love, play, and teaching. We think these represent misconceptions about children and how they develop – and that these adults would greatly benefit, themselves, from seeing and then trying out new ways to express love, play, and teaching.

Note: we do not believe the scientific evidence supports a one-size-fits-all approach or there is a single theory that prescribes one and only one “best” way to nurture and educate all children. When scientists develop a theory-based program and discover that it is effective, some people may incorrectly conclude that this means all children will have to participate in that particular program, if they are to benefit. In general, most theories of science would argue against this interpretation, because the program was perhaps just one way of many possibilities of getting the right types of experiences to particular children at certain times or sequences in their lives. There likely are multiple routes to achieve the same benefits.

Scientific theory for the highly successful programs has functioned in much the same way that an educational philosophy has for many educators and parents. Both the theory and the philosophy can be used to foster a common understanding and promote effective communication about practices supported by the theory or philosophy.

Another important aspect of scientific theory is that each of its elements is defined in ways that are operationalized. When a scientist uses a theory that hypothesizes that “responsive care” of the child and that “cognitive stimulation” to optimally challenge the child beyond his or her current level are among the vital dimensions to promote healthy social, emotional, and intellectual development, then the scientist must define these terms specifically in behavioral and observable terms, so that someone can be taught to care for and to teach a child in these ways and so that these program elements can be directly and objectively measured as having occurred.

3. Program dosage (the amount of the program or treatment) was well matched to the program goals and the needs of participating children. Often, the programs that produced the largest and most lasting benefits were among the highest in their dosage, as measured by particular experiences indexed by hours per day, days per week, weeks per year, and number of total years. In everyday terms, the programs provided children and families with a lot of good and specifiable supports and opportunities over an extended period of time. This idea that the amount or the intensity of a program matters is highly consistent with most theories about children’s learning and development. Complex skills, deep knowledge,

and life competencies benefit from multiple and varied learning opportunities, lots of review and practice, trial-and-error experiences, and useful feedback. Most highly successful programs focused their efforts on improving high-risk children's outcomes in multiple domains – usually including social-emotional competence, cognitive and academic skills, and health promotion and risk avoidance – all areas that have many controlling facets and thus benefit from programs that are intensive or high in their dosage. So the conclusion that it takes more than a short summer program, a few days per week of hourly tutoring, or a monthly mentoring programs to produce large and lasting benefits for very high-risk children is hardly surprising. At the same time, the dosage principle always needs to be adjusted relative to a program's specific goals and the children enrolled. For example, there are programs that are highly focused on teaching a particular skill set or changing a child's motivation in a key but very limited area of development; for these programs, the dosage might be far lower than for programs seeking to prepare at-risk children for successful transitions to typical elementary schools or for programs that hope to change the life course of students who are highly likely to drop out of high school and not enter college because of limited knowledge, skills, and motivation.

There are several ways of measuring a program's dosage, though none is adequately precise or entirely satisfactory (cf. S. Ramey et al., 2011). Many effective early childhood programs provided services to high-risk children and families for multiple years. The Abecedarian Project and Project Care, for example, provided each child with a specified high quality educational program in a child development center for a full day (ranging from 6 to 10 hours), 5 days per week, 50 weeks per year, for 5 years (until the child was old enough to enter public school kindergarten). These were among the most intensive (high dosage) programs ever studied. In contrast, the Perry Preschool Program enrolled children at 3 or 4 years of age, after the children already showed considerable *delays* in their development (placing them substantially below the normal range), and provided a half day, 5 days a week program for the academic year for one or two years. This program also produced impressive long-term benefits for these children. The Chicago Parent-Child Centers was a large-scale program that offered services over many years; some of the children participated for only one or two years, while others participated for three or four years. For some of the child outcomes, there were benefits from the higher dosage, but not always.

Historically, the topic of intensity or dosage has been one that is treated with great centrality in the health professions, but much less so in

behavioral and educational circles. At the same time, providing too little of something – even when it is of high quality – might not be better than nothing at all. This issue is a frontier issue in the science of education. We frame this issue as: How Much, When, For Whom, Why, and at What Cost? To What End? These are the kind of refined issues that belong to the next generation of program innovators and research scientists. To us this is an exciting point of embarkation and shows an advance from the question of “Can early intervention make a positive difference in children’s current lives and school readiness?”

4. Multiple features and pathways were included in the program to achieve maximum desired experiences for children, permitting individualization and flexibility that were inherent in the program models of education. Most programs for children that are in the educational and behavioral domains are seeking to instill a broad set of skills and good habits in children. This is also true of the new wave of programs seeking to curtail the epidemic of childhood obesity and associated increased health risks for diabetes, high cholesterol, and hypertension in young children – something unprecedented in earlier generations. These programs often are built directly upon developmental theory which advances the idea that the competencies, the receptivity, and the habits formed in certain domains of development (health, language, social interactions, emotional self-regulation) at one stage of development then serve to prepare the child for transition into more advanced stages of development. Most of what children learn and do requires lots of exposure, practice, and variation in the situations when these new skills and ideas are used. Accordingly, the programs themselves seek to help promote these aspects of a child’s development through multiple activities. Sometimes these are encouraged through formal instruction combined with the child’s opportunities for natural observation, exploratory guided play, and daily self-care and social activities. By building in many different ways to help a child learn about something and then practice and extend these new skills and knowledge, the outcomes are likely to be stronger, more flexible, and more useful to the child. This is why so many programs try to engage parents, as children’s first and foremost teachers during the early years of life, and then alternate as important role models and monitors of their child’s behavior and safety. The program flexibility that we know about is difficult to document or quantify; but the programs granted teachers and caregivers opportunities to propose changes, make adjustments in the pace of the curriculum, and identify concerns that warranted individual solutions. We think that had the programs been totally rigid in their protocol, they may have been less successful.

5. Before the program was implemented, it was supported by both external peer or expert review and members of the local community. The highly successful programs that have been so inspirational were funded through competitive peer review or through selection by foundations or governmental agencies that established criteria for selecting grantees. Many of these programs were reviewed frequently over their operational period and these competitive reviews undoubtedly motivated the program teams to plan carefully and to establish strong justification and evidence that their programs could be well implemented. In addition, the successful programs often engaged members of their local communities and practitioners/educators in helping to plan for and to launch the program. The external review and support for these programs truly was essential – but these factors also may have promoted greater openness and multiple layers of accountability. These programs did not operate in a closed system unto themselves. Further, the endorsements obtained from the community and outside professionals and scientists served to broaden the interest in the program and probably helped to increase the successful recruitment of children and families, as well as encourage the children and families to participate at high and sustained levels – thus receiving the intended “dosage” of the program.

6. Program staff were highly skilled and well prepared to fulfill their roles in the program – because they received strong initial training followed by active, ongoing professional development supports and systematic supervision. Many of the programs were highly original or innovative when they were launched. Thus, the programs had to develop training for the staff members who were responsible for working directly with families and children. These were not programs that simply relied on existing professionals who already knew exactly what to do – that is, the nurses, teachers, child care workers, or social workers were not just using their own individual professional opinions and judgments. Rather, the staff recognized that they were being asked to help pioneer and test new forms of interventions to benefit children. Accordingly, the initial training often was intensive, and because the programs were new, the training did not stop when the program was launched. Rather, almost all of these programs held frequent staff meetings and actively supervised and supported staff in frontline positions, providing additional on-the-job training in the form of supports, advice, information, and problem-solving. The professional development was an integral part of the program, and the staff understood the importance of having everyone being highly capable and consistent in their work. (Note: the amount of formal education required by staff varied widely across and

sometimes even within programs. Regardless of job title, staff were considered team players vital to the program's success.)

7. Implementation of the program was actively monitored by the program leaders; this helped to detect and resolve problems early and served as a natural means of recognizing staff for excellence in their work. Performance expectations were clear to staff, as well as the immediate goals for improving children's outcomes. Programs that are scientifically studied necessitate careful documentation about what occurs. This open monitoring of a program serves to make clear to everyone exactly what is expected. These expectations or standards for the program ideally are linked to documentation procedures that the program was implemented on time and consistent with its proposed plans. The methods, however, varied across the successful programs, but often included written documentation by staff in a systematic manner, frequent and unannounced observations by program leaders and supervisors, outside site visits by funding entities, and independent observations by trained data collectors about the program delivery. A high level of monitoring also helped with early detection of problems – and was linked to efforts to correct these problems and avoid them in the future. This active monitoring of the programs came from the leadership and the entire team, who saw these procedures as necessary and positive – rather than as externally imposed, intrusive, arbitrary, or punitive.

8. There was a clear commitment to encouraging high levels of participation among all children and families, including planned strategies to overcome potential barriers to full participation. When a program is new and being tested, it is crucial to have high levels of participation from all children assigned to receive the new program or treatment. In a randomized controlled trial, one of the scientific standards is that all children and families assigned to the treatment or the control group will be studied and their outcomes will be measured, *regardless of whether they fully participate or not*. The insider phrase is, "Once randomized, always analyzed." Accordingly, a scientist testing a theory-guided program would predict the program will work if and only if the intended participants receive it. This means that if a program plans to have parent meetings, then all parents need to be encouraged to attend all meetings to fully test that aspect of the model. Understandably, some children and families have reasons that keep them from participating fully in all aspects of the program. This can, to some degree, be taken into account in later data analyses via statistical adjustments, but major problems with the level of participation of children or families (that is, receiving much less than the intended dosage level) would serve to reduce the program's

potential efficacy. In some ways, this feature served as a motivator to staff at all levels to be sure that children and families had maximal opportunities to benefit from their program.

9. Unbiased multiple assessments of children's progress were collected from the start and were explicitly valued as essential to understanding program effects. The children in many of the successful programs came from life circumstances recognized as extremely challenging and far from ideal; thus the children had a high likelihood of not doing well. In some programs that included a mix of children from both high- and low-risk backgrounds, the children were still expected to benefit from what the program offered to them. (Even programs for highly academically gifted children may view the participants as potentially at risk if the children do not receive educational programs that truly meets their cognitive and social-emotional needs.) All of these programs for high-risk families measured the children at regular intervals using procedures that were considered valid and reliable as a way of measuring child development over time. These measures, similar to those about the program implementation and program quality, were highly valued by the program leaders, and were internally supported rather than externally imposed on the program. The programs did not feel threatened by these measures; to the contrary, they valued them as indicators of the extent to which the program was achieving its intended goals.

10. The information gathered about the program and about children's progress was analyzed and reported to both the program team and to external groups. When data are collected as part of scientific research funded by public dollars (as was true for the majority of the successful programs), the data are expected to be reported in a timely and open manner. (Note: currently, most federal research grants require that the datasets collected eventually enter the public domain, although this policy was not in effect when many of the landmark studies were conducted.) The information collected often was analyzed as soon as possible – because it was the basis for making new discoveries and for advancing the understanding about what promotes children's positive development. Team members and leaders were actively involved in developing plans for how the data would be analyzed. High levels of interest and excitement often accompanied the data analysis and interpretation phase of the successful projects. In many cases, the findings at one stage of children's development helped with decisions about the program and its future – and propelled the commitment to following the children longitudinally as they grew up.

11. Program developers recognized that replication of the program would be an important next step if the results affirmed benefits to children and families. Thus, the program's content and procedures were documented sufficiently to allow replication.

The scientific framework demands that an experiment be replicable. Results from a project tested once and only once are not considered as strong as programs that have proven their benefits repeatedly. From the beginning, the successful programs were planned in ways that permitted replication if the results supported doing so. The detailed description of these programs, however, did not mean that they were readily exportable to all settings or that others who were not deeply knowledgeable about certain aspects of children's health or development could easily implement them on their own. Another factor is that replication often involves testing the same general program with a somewhat different group of children and families in a somewhat different social, cultural, geographic, and political context. This distinctive feature of many successful programs is a great strength, because this forms a solid foundation for future scale-up programs and adaptation of the successful treatments and interventions so that large numbers of children may benefit in the future.

12. The leadership had sufficient resources and control over expenditures so that the key components would be delivered, yet changes could be made quickly if problems arose. The scale of these programs ranged considerably, although many were small to moderate at first. More importantly, the programs perceived there was a good match between resources available and the expectations for implementation. Highly successful programs need to have resources sufficient to implement the program, including not just basic operations but the initial and ongoing training and professional development of staff, reaching out to and engaging parents and children in participating, measuring the program and its impact on children, and analyzing the data collected. These successful programs did not have to choose between providing services or evaluating their effects on children; rather, the resources were intended to be used for both purposes and this was viewed positively, for resources between funding the direct services and supports to children and funding the professional development, active monitoring, and data collection. The programs considered all of these features as essential.

How practically useful are these hallmarks for informing the planning, implementation, and assessment of scale-up and future quality improvement initiatives in real-world settings?

We have pondered whether some of these hallmarks are much more important than others. *At a minimum*, we cannot imagine how these

programs could have been as successful as they were without having strong and deeply knowledgeable leadership, a clear theory that guided their implementation of the program and was directly linked to potential benefits for the children, strong professional development and training for their frontline staff, and an active accountability system that measured both the program and the children.

A legitimate and longstanding concern remains about the transportability of these “hothouse experiments” to real world settings. Most were not designed initially in a way that tried to take into account the evolving complex regulations that today influence how public schools, Head Start programs, subsidized child care, pediatric health care, and other social supports service delivery systems currently operate. Indeed, there is no one standard template for how these real-world systems operate today, as we have learned in the more recent multi-site research we have conducted, where the scientific studies have included implementing highly comparable interventions in different cities, towns, and rural areas across different states and Indian nations. For us, the challenge is this: can these hallmarks of the highly successful programs provide a practically useful guide for what needs to be considered, and what might need to change, in the real world systems that serve children?

At first, the best of the research that sought to improve children’s lives was focused on finding out *if* children could truly benefit from participating in these theory-guided and evidence-based programs. To the extent that the answers affirm the value of these programs, then the political and practical next steps need to build upon what is known. These hallmarks of highly successful programs are revealing. Together they force us to question as to what extent these hallmarks can become part of the existing systems of care and education.

Interestingly, these hallmarks of successful programs that benefited children also closely parallel the research process. Specifically,

- Both begin with rigorous planning and careful implementation. They continue by measuring the results and having the results reviewed by peers.
- The most successful interventions were *not* just inspirational or ideological, led by charismatic individuals. Nor were they externally imposed on project managers or frontline staff. Instead, they were solidly grounded in scientific evidence, and they were consistent with developmental (and often neurobiological) theory about children.
- The measures to assess individual children were not arbitrary or unrelated to the program’s goals. Instead they were chosen by the program developers as germane to the program’s goals.

- The enthusiasm of those involved in implementation often was high, and these projects had considerable degrees of freedom and control in how they operated.
- Reaching all children or families assigned to receive the intervention or treatment was considered a high priority – how else could the program impact a child except through active participation?

Science in the past 40 years has become increasingly competitive, strongly peer-reviewed, and closely monitored at all stages. Project participants are told in advance about the program, what its intended benefits are, what the risks might be, and they are counseled to understand their right to seek more information about a program and how they (parents and children) are progressing. Even when scientific research projects are conducted in schools and “real world” service settings, they require the same level of openness and peer review. This includes informing parents and children clearly and in advance about what the researchers intend to do, why they are doing it, who will be held responsible, how the child’s safety and well-being will be monitored, and the ways in which the service or school system will use the information collected to modify and improve future services. In the real-world, many “experiments” occur all the time – often described as reforms, improvements, creative solutions, and new strategies – but seldom are the standards of science used at all levels to plan, monitor, and ultimately judge the effectiveness of these naturally occurring experiments.

The Ground Rules of Science. In looking for the hallmarks of the successful programs, we must realize that these were conceptualized as scientific experiments to test an idea. There are ground rules in our world of science – complex and unrelenting in their own right – regarding how to test the merit of a new (and thus unproven) treatment or program. We must first test our new program in a very careful and systematic manner, considered absolutely necessary to determine whether our strategy (supported by scientific hypotheses and building on what is known at that time) can generate at least some evidence of being right (correct, meritorious to pursue further, consistent with other evidence about how children develop and change over time). So as scientists we set up human experiments (clinical trials) that are vetted *in advance* by our peers as being worthy of pursuit, being ethical to conduct with minimal risks to participants and having a favorable ratio of possible adverse effects to potential benefits), and having the potential to generate robust knowledge that will be useful to scientists and practitioners in the future, *even if our program does not produce the hoped for benefits*. Accordingly, we are required by our professional standards to launch these studies in ways that allow us to have sufficient control over

the factors (the study variables) that we hypothesize (think) will be important in changing the lives of children. So when scientists engage in testing a program, we must have confidence that the plans we generate for treatment will be implemented fully and that the individuals we invite and then enroll in our studies will actually receive the intended program. We are required to closely monitor the participants and their responses to the program. We build in many checks and balances on this process of documentation (data collection), and the information collected is analyzed in ways that are publicly verifiable, thus minimizing distortion of findings. *So, is it possible that some of the features of sound science were instrumental (causal) in producing effective programs?*

We think there now is ample evidence that many of the original successful projects have been replicated – with some variations – in other places, by other people, or with new groups of children. We also acknowledge that too few of these successful programs have been tested adequately when they are adapted for places where the children or the natural support systems differ considerably from the conditions in the landmark experiments. Similarly, we agree that many pioneering programs had advantages, including strong, passionate, and capable leadership with dedicated, caring staff who worked energetically and effectively, continuously learning on the job and being watched (monitored) by others. These projects had measurement systems in place, from the beginning and through to the end; these were measurement systems they selected and the findings about children and program quality were central to their existence – not viewed as burdensome and potentially punitive. If the measurement systems showed that things were not going as expected, then the programs themselves wanted to know this – so they could change, improve, and do whatever they needed to do to deliver on the promise of helping children truly thrive. Freedom to modify the program, to increase the training and supports for teachers or home visitors, and to ask staff to do something extra or new was definitely a feature of these pioneering studies as well. Above all, what we can tell others – after 40+ years' worth of frontline experiences and immersion in detailed statistical analyses about these pioneering studies is that what changed the children and gave them brighter futures were *the adults* who on an everyday basis nurtured them, taught them, challenged them, protected them, promoted their health and curiosity, and showed respect for and helped to support and educate the children's parents as well.

Part Two: The Significance of What Happens After Children Receive a Strong Early “School Readiness” foundation

We acknowledge how challenging and inadequate retrospective consideration is concerning precisely what was important for children who participated in the successful programs when they moved into public school settings that varied in quality. The data are sparse and thus opinions, including our own, abound. A landmark analysis by Currie and Thomas (1995) using large public databases about school quality supported the conclusion that when Head Start children enter reasonably adequate schools, the advantages from early learning continue, but when they enter very low-quality schools, there is an erosion of the benefits. Tragically, the economic and racial disparities in the matter of who attends high- versus low-quality schools are immense. We nominate that the same ideas that have guided the early care and education programs – summed succinctly in the statement “It is the cumulative relevant learning and life experiences – inside and outside the home – that produce more or less competent, caring, and creative children” – should extend more vigorously into our consideration of what it will take to ensure that children continue to progress well after they receive a strong foundation and enter school well prepared.

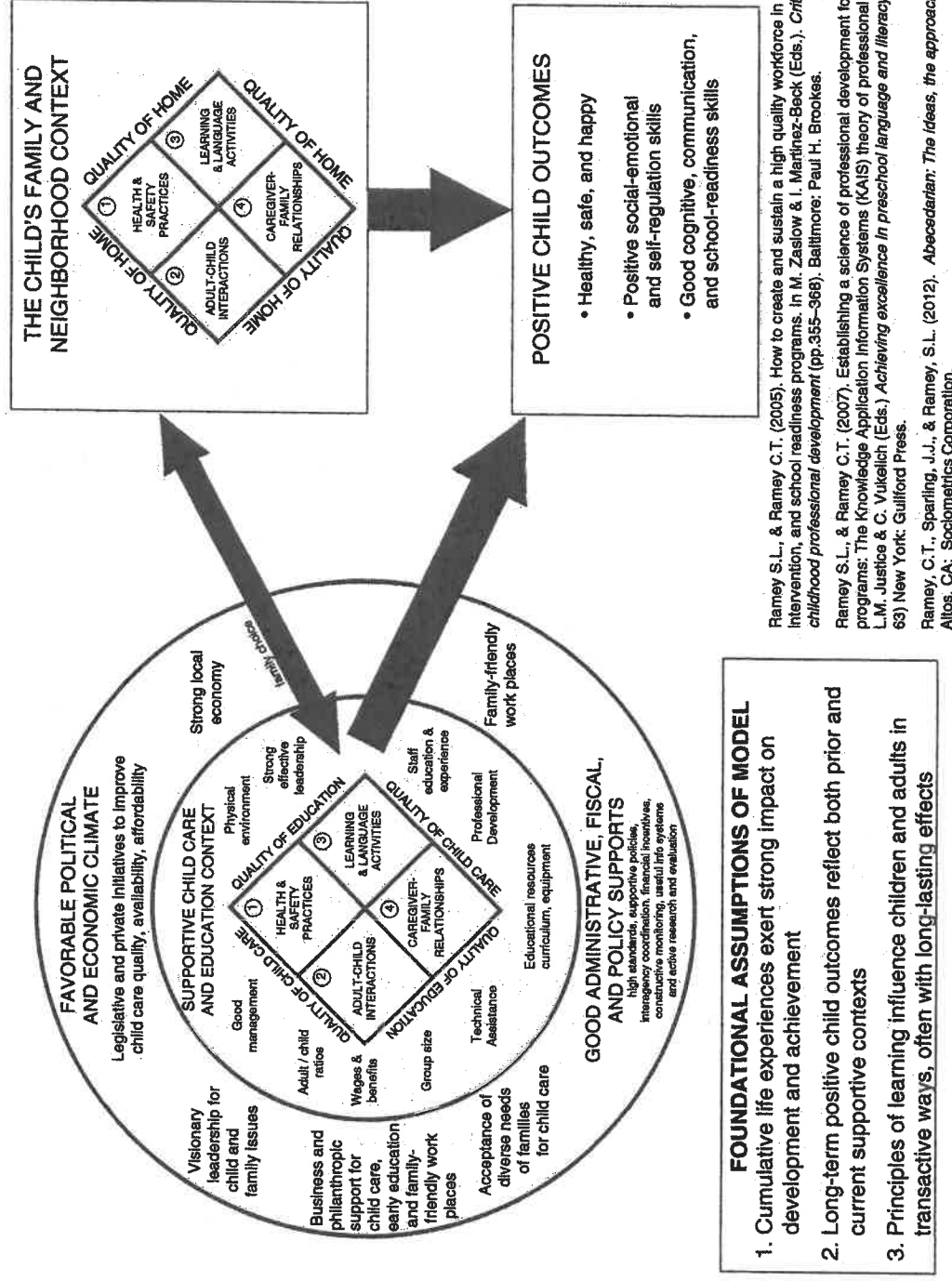
School occupies many hours of the children’s weekly waking hours, and produces large amounts of learning. At the same time, children are profoundly influenced by what happens before and after school during the weekdays, what occurs on the weekend, and their summer learning experiences. Ample scientific evidence from both observational and interventional studies affirms the totality of experiences statement assumption above. Ironically, when we try to simplify measure of the quality and impact of school by a simplistic set of measures – such as relying on average group performance on standardized tests once a year – we defy much of the scientific evidence about human growth and development. We know that children’s school progress and overall well-being are far more than what their standardized test scores capture (not to discount these entirely, however). One inherent problem is that standardized test scores are not necessarily attributable primarily to what occurred in the classroom – although a year in an excellent classroom can make a big difference. As we shift the study paradigm from a “maintain the gains from investments prior to kindergarten” to a more integrated life course perspective, we advocate strongly that measuring children’s learning opportunities more comprehensively could set the stage for parents, communities, schools, and health care providers to work more efficiently

and collaboratively. We do not favor continuing the model of designing special demonstration projects that operate under auspices largely outside the existing natural institutions and local support systems or that depend primarily on infusion of new dollars that are not likely to be sustainable under current policies and funding mechanisms. In fact, we suspect that decades of this approach has created a strong natural backlash and a set of attitudes that decrease receptivity to change – a “here today, gone tomorrow” or a “didn’t we try that a while back and whatever happened to that report?” mindset toward educational and community reforms. We do harken back to the proposed set of hallmarks of successful early childhood programs and ask the question of how applicable these features might be to facilitate the following: creating stronger and more effective schools, to implementing parent engagement programs that produce measurable benefits for children and families (unfortunately, some appear to have been iatrogenic), providing high quality and multi-year sports and artistic-pursuit programs for children from all walks of life, offering summer programs filled with experiences that are mentally, physically, and socially rewarding, and ensuring that children who work hard in their childhood tasks of learning, inside and outside of school, will be confident that they have a certain chance to keep on working hard as they grow older and transition into young adulthood. We often have envisioned issuing a Birth to Adulthood “report card” that measures for each child the quality, amount, and types of environmental supports and experiences they have to learn, play, socialize, create, and be healthy; and checks whether systems are in place to limit their exposure to adverse life events and toxic environments. If such a contextualized and lifespan card existed, perhaps embedded within health care records and school records, and shared with families directly, then we would be able to monitor our population in new and highly innovative ways.

We have been immensely fortunate in getting to know and work with so many dedicated individuals, groups, foundations, and public agencies and institutions that have supported the knowledge growth about early childhood interventions. We do not think we have all the answers, yet we hope that deep reflection and constructive debate can move into new arenas and engage a wider group of stakeholders, including the parents and children directly affected by this body of research.

In this presentation, we introduce – albeit late and only briefly – a broad systems framework we developed to capture multiple levels of influence that contribute to the provision of high-quality early child care and education. Figure 15.1 illustrates some, but not all, of the variables operative in the systems framework. The Four Diamond Model resulted from three years of intensive statewide collaboration in Alabama with

Four Diamond Model for Improving the Quality and Benefits of Early Care and Education



Ramey S.L., & Ramey C.T. (2005). How to create and sustain a high quality workforce in child care, early intervention, and school readiness programs. In M. Zaslow & I. Martinez-Beck (Eds.), *Critical issues in early childhood professional development* (pp.355-368). Baltimore: Paul H. Brookes.

Ramey S.L., & Ramey C.T. (2007). Establishing a science of professional development for early education programs: The Knowledge Application Information Systems (KAIS) theory of professional development. In L.M. Justice & C. Vukelich (Eds.) *Achieving excellence in preschool language and literacy instruction*. (pp. 41-63) New York: Guilford Press.

Ramey, C.T., Sparling, J.J., & Ramey, S.L. (2012). *Abecedarian: The ideas, the approach, and the findings*. Los Altos, CA: Sociometrics Corporation.

Figure 15.1 Four Diamond model for improving the quality and benefits of early care and education

hundreds of stakeholders. The framework allowed highly diverse individuals and entities to think about what matters most for producing positive outcomes for children. Of highest saliency is that this model does *not* assume that all potentially supportive factors must be present for children to experience the critical proximal experiences deemed valuable (through scientific research and direct observations of many parents and providers). That is, this model explicitly showed that there could be multiple pathways to support positive outcomes for children, thus avoiding the longstanding conflicts that seem to pit programs against one another, or takes sides about whether out-of-home programs are better or worse than a family-based approach. This multiple pathways idea also implies that the contextual and more distal factors – such as well-educated staff who receive excellent salaries and benefits, low child-to-adult ratios, high quality physical settings with lots of materials and supplies, high standards for licensing certain providers, or a strongly supportive citywide or statewide initiative with high levels of funding – can serve as a proxy to indicate that children are receiving high-quality care and education. All too often, formal systems of rating have relied on the distal supportive factors, rather than directly observed what is happening when children are in non-parental care and when they are in their own family. We then continued to adapt and use this, not for a theoretical framework about children's development per se, but as a perspective on what can facilitate versus impede successful real-world implementation. The model includes a multi-pronged set of child outcomes, recognizes the distinctive and useful roles of multiple individuals and groups, yet places as *the central most important factor on a child's life the amount and quality of experiences under the four domains (diamonds) of Health and Safety Practices, Learning and Language Activities, Adult-Child Interactions (sometimes labeled warm and responsive caregiving), and Caregiver-Family Relationships*. Accompanying this model we developed, in collaboration with others, and through systematic review of many other environmental and assessment tools, a brief checklist of what we consider to be absolute basic essentials that should be present in every single child's life for the first five years. This is but one of many frameworks, but we leave these as examples of how partnerships can generate shared understandings and move forward to agree on how to invest wisely and strategically in improving the future for children and nation.

Conclusion

A remarkably rich set of scientific publications and program evaluations affirm that some early childhood initiatives and programs can

produce outcomes that have strong, practical value for individuals, families, and communities. Further, under some conditions, increasing the positive outcomes for young children has proven to be crucial in setting the stage for continued positive progress as children transition into public school and later into adulthood. We conclude that the existing databases on these topics, although certainly amenable to more and more data analyses, create a strong, instructive set of working principles to consider in today's highly diverse settings with major shifts in demographics and support systems. That is, the findings from successful programs repeatedly affirm human potential (neuroplasticity) and the universal needs of young children in terms of the inter-related domains of cognition, language, social-emotional development, and physical health. At the same time, the programs that failed to produce large and enduring effects mostly ignored the working principles and failed to meet the universal needs of young children.

In this presentation, we have reflected on features of some of the most successful programs that altered the lives of highly vulnerable young children, and nominated a set of 12 features we label "hallmarks." The success of these programs depended on many levels of support, adequate training, resources, and ongoing and objective measures of both the programs and the children's progress. These programs understood children's development and had guiding theories of how children learn. When the early benefits appear to lead to later positive outcomes, this often reflects the fact that children entered schools that continued to support their development, had supportive families, and/or lived in communities with multiple ways to assist children and families at the next stages of development. This is consonant with an abundance of biobehavioral data that both prior and concurrent opportunities exert significant influences on performance and health. Additionally, the perception that there are future good prospects may comprise an operationalized portrayal for children, families, teachers, and clinicians to have hope (i.e., to value rather than discount the future) (Bickel et al., 2014) and to be motivated to do their best and stay active and healthy.

Finally, we recognize that our notion that it would be a good thing to run the real world like a scientific experiment may appear to be quite science-centric. Yet at the heart of science is an unrelenting set of standards for discovering truth and then using what we know now (the best iteration of truth) to take actions that have applied value. Continuing the process of gathering useful data, analyzing the information, sharing it widely, promoting vigorous and constructive

debates, and trying to do things even better, more efficiently, at lower cost, or with exciting novel additions is an amazing story of what has happened since the 1960s and 1970s – showing that under the right conditions, most children can overcome the dire predictions based on the circumstances of their birth, becoming productive citizens in a vibrant democracy and complex world.

Inventing and Delivering a Better Future for Young Children

If we in the United States of America are to achieve a more supportive and equitable landscape for children from birth on, there are several strong recommendations that we advocate.

First, we must acknowledge that early childhood programs can support adequate school readiness and subsequent school progress spanning academic achievement and social-emotional adjustment. Quality matters! Poorly implemented programs of low dosage are ineffective investments and need to be rapidly improved or eliminated. As Phillips et al. (2017) recently affirmed, not all pre-K programs are equal.

Second, investments in early childhood programs must be monitored and consequential. We think that unannounced and behaviorally focused “quality monitoring” visits should become the expected norm in all publicly funded programs. These visits should be directly coupled with specific and timely professional development activities and technical assistance. Parents, too, should have a formal voice in ongoing evaluations of early childhood programs.

Third, credentialing standards and compensation for pre-K teachers and assistant teachers should be made equivalent to comparable K–12 personnel.

Fourth, all early childhood programs should be required to develop plans for coordinating health and mental health supports, before and after childcare, and family social services. This recognizes that children’s success in school and, later, into adulthood depends on recognizing and meeting their multiple needs at each stage of development. Schools cannot do this alone; families and communities need to be active partners in supporting children’s holistic growth and development.

Fifth, there needs to be an unwavering commitment to measuring and publicly reporting each child’s development, not only for mandatory reporting but for use to inform adjustments to a child’s education plan.

Sixth, partnerships are an effective way of sharing expertise to mutual

✓ = Pass
✓- = Partial
Blank = not passed

THE Q-STAR CHECKLIST (2013)
The Foundational Cornerstones for High-Quality Care and Education: Birth to age 5
Sharon L. Ramey, Libbie Sonnier-Netto, & Craig T. Ramey

Place:	Date:	Time Observed:
Observer:	# of adults :	# of children:
Age group:	Infant/Toddler:	Preschool:

Adult IDs	A ₁	A ₂	A ₃	
				WARM AND RESPONSE CARE
				1. Children's names used often with real warmth.
				2. Adults show joy, liking, and concern for every child.
				3. Adults & children have back-and-forth play and conversations.
				4. Children encouraged to explore and try new things.
				5. Children's needs and questions responded to positively and promptly.
				6. Adults care and teach about children's feelings and good ways to handle them.
				7. Adults encourage and teach children to play and cooperate with others.
				8. Adults observe individual children and adjust activities as needed.
				9. Children are not teased or bullied. If so, adults act quickly to help.
				10. For a child with special/extra needs, adults actively address their social and emotional needs.
Total ✓s				
				LANGUAGE AND LEARNING
				1. Adults use children's interests and activities to teach new skills and ideas.
				2. Adults use daily routines and "in between" times to teach many things.
				3. Adults actively teach children many words and communication skills.
				4. Adults praise children for specific new things they are learning.
				5. Toys, books, and materials organized so children can find and use them often.
				6. Adults read a lot with children, in ways that teach early literacy skills.
				7. Adults teach children a lot about math and science.
				8. Children get to practice new skills and improve through play.
				9. Adults help children learn to plan, pay attention, ask questions, and problem solve.
				10. For a child with special/extra needs, adults actively address language and learning needs.
Total ✓s				
				HEALTH AND SAFETY
				1. Good hygiene practices evident.
				2. Indoor and outdoor areas safe and secure.
				3. Children physically active throughout the day.
				4. Children not made to be still or quiet, except briefly.
				5. Nap and quiet time offered, but not forced.
				6. Safe practices for sleeping/napping, feeding, and going places.
				7. TV, video, and screen time limited and positive.
				8. Almost all food and drinks are healthy.
				9. Adults can administer First Aid and handle emergencies.
				10. All adults look for and immediately report possible child neglect and abuse.
Total ✓s				
				FAMILY CONNECTIONS WITH OTHERS WHO CARE FOR & TEACH THEIR CHILDREN
				1. Parents encouraged to visit and share ideas with providers/teachers; and parents do this.
				2. Providers/teachers & parents know one another by name and their role in the child's life.
				3. Providers/teachers & parents share with one another what a child is learning and ways to practice.
				4. Providers/teachers keep up-to-date about each child's family and home life.
				5. Providers/teachers & parents meet often to talk about the child's progress, strengths, and needs.
				6. Providers/teachers & parents work together to solve any problems that arise.
				7. Providers/teachers & parents work together to prepare a child for major transitions.
				8. Providers/teachers & parents show mutual caring and respect.
				9. Providers/teachers & parents understand the rules and values in their settings.
				10. Providers/teachers & parents together make sure children are not at risk for neglect, abuse, or harsh treatment
Total ✓s				

Figure 15.2 The Q-STAR checklist (2013)

advantage and to realize cost-effectiveness and efficiency. University/community partnerships can exist in all states as well as in most communities. State and land-grant universities with an explicit mandate to service their local and regional populations are particularly attractive potential partners. These partnerships can help bridge the gaps between scientific knowledge, human development, relevant educational and healthcare practices, and public policy.

We think these six recommendations are accomplishable with the knowledge base that currently exists and with a rearrangement of many of the resources already in place. We cannot think of any acceptable excuses for failing to provide high-quality opportunities for learning and development to all children who live in our country. We know the serious personal, family, and community toll – economically, socially, and psychologically – of allowing young children to grow up without the essentials to succeed in school and life. The future of our democracy is inextricably linked to the future of children. If high-quality early childhood programs become the norm, our country as a whole, as well as particular children and their communities, will benefit.

References

- Barnett, W. S. (2004). Does Head Start have lasting cognitive effects? The myth of fade out, in Zigler, E. & Styfco S. J. (Eds.), *Head Start Debates* (pp. 221–249). Baltimore, MD: Paul H. Brookes.
- Barnett, W. S. & Carolan, M. E. (2014). *Facts about Fadeout: The Research Base on Long-Term Impacts of High Quality Pre-K (CEELO FastFact)*. New Brunswick, NJ: Center on Enhancing Early Learning Outcomes.
- Bickel, W. K., Moody, L., Quisenberry, A. J., Ramey, C. T. & Sheffer, C. E. (2014). A competing neurobehavioral decision systems model of SES-related health and behavioral disparities. *Preventive Medicine*, 68, 37–43. PMID: 25008219.
- Camilli, G., Vargas, S., Ryan, S. & Barnett, W. S. (2010). Meta-analysis of the effects of early education interventions on cognitive and social development. *Teachers College Record*, 112(3), 579–620. Available at: http://rci.rutgers.edu/~camilli/Papers/38_15440.pdf.
- Campbell, F. A., Conti, G., Heckman, J. J. et al. (2014). Early childhood investments substantially boost adult health. *Science*, 343, 1478–1485.
- Campbell, F. A., Ramey, C. T., Pungello, E., Sparling, J. & Miller-Johnson, S. (2002). Early childhood education: young adult outcomes from the Abecedarian Project. *Applied Developmental Science*, 6, 42–57.
- Currie, J. & Thomas, D. (1995). Does Head Start make a difference?, *American Economic Review*, 83, 241–364.
- Dodge, K. A. (Ed.) (2017). *The Current State of Scientific Knowledge on Pre-Kindergarten Effects*. Durham, NC: Duke University.
- Heckman, J. J., Moon, S. H., Pinto, R., Savelyev, P. A. & Yavitz, A. (2010). The rate of return to the HighScope Perry Preschool Program. *Journal of Public Health*, 94, 114–128.
- Kay, N. & Pennucci, A. (2014). *Early Childhood Education for Low-Income Students: A Review of the Evidence and Benefit–Cost Analysis* (Doc. No. 14–01–2201). Olympia, WA: Washington State Institute for Public Policy. Retrieved from: www.wsipp.wa.gov/ReportFile/1547/Wsipp_Early-Childhood-Education-for-

- Low-Income-Students-A-Review-of-the-Evidence-and-Benefit-Cost-Analysis_Full-Report.pdf.
- Lazar, I. & Darlington, R. (Eds.). (1982). *Lasting effects of early education: A report from the consortium for longitudinal studies*. Monographs of the Society for Research in Child Development.
- Lewin, K., (1951). *Field Theory in Social Science: Selected Theoretical Papers*. Oxford: Harpers.
- Phillips, D. A., Lipsey, M. W., Dodge, K. A. et al. (2017). Puzzling it out: the current state of scientific knowledge on pre-kindergarten effects: a consensus statement, in Dodge, K. A. (Ed.), *The Current State of Scientific Knowledge on Pre-Kindergarten Effects* (pp. 19–30). Durham, NC: Duke University.
- Ramey, C. T. (1982). Commentary, in Lazar, I. & Darlington, R. (Eds.), *Lasting Effects of Early Education: A Report from the Consortium for Longitudinal Studies*. Monographs of the Society for Research in Child Development, 195, 142–151.
- Ramey, C. T. (2018). The Abecedarian approach to social, educational, and health disparities. *Clinical Child and Family Psychology Review*. PMID:29637322
- Ramey, C. T., Campbell, F. A., Burchinal, M. et al. (2000). Persistent effects of early childhood education on high-risk children and their mothers. *Applied Developmental Science*, 4, 2–14.
- Ramey, C. T. & Ramey, S. L. (1998). Early intervention and early experience. *American Psychologist*, 53, 109–120.
- Ramey, C. T., Sparling, J. J. & Ramey, S. L. (2012). *Abecedarian: The Ideas, The Approach, and The Findings*. Los Altos, CA: Sociometrics Corporation.
- Ramey, S. L., Crowell, N. A., Ramey, C. T., Grace, C., Timraz, N. & Davis, L. E. (2011). The dosage of professional development for early childhood professionals: how the amount and density of professional development may influence its effectiveness. *Advances in Early Education and Day Care*, 15, 11–32.
- Ramey S. L. & Ramey C. T. (2005). How to create and sustain a high quality workforce in child care, early intervention, and school readiness programs, in Zaslow, M. & Martinez-Beck, I. (Eds.), *Critical Issues in Early Childhood Professional Development* (pp. 355–368). Baltimore, MD: Paul H. Brookes.
- Ramey S. L. & Ramey C. T. (2007). Establishing a science of professional development for early education programs: the Knowledge Application Information Systems (KAIS) theory of professional development, in Justice, L. M. & Vukelich, C. (Eds.), *Achieving Excellence in Preschool Language and Literacy Instruction*. (pp. 41–63) New York, NY: Guilford Press.
- Ramey, S. L., Ramey, C. T., Phillips, M. M. et al. (2001). *Head Start Children's Entry into Public Schools: A Report on the National Head Start/Public School Early Childhood Transition Demonstration Study* (Contract No. 105–95–1935). Washington, DC: US Department of Health and Human Services, Administration on Children, Youth, and Families.
- Reynolds, A. J. (2000). *Success in Early Intervention: The Chicago Child-Parent Centers*. Lincoln, NE: University of Nebraska Press.

- Reynolds, A. J., Temple, J. A. & Ou, S. (2010). Impacts and implications of the child-parent center preschool program, in Reynolds, A. J., Rolnick, A. J., Englund, M. M. & Temple, J. (Eds.), *Childhood Programs and Practices in the First Decade of Life: A Human Capital Integration*. New York, NY: Cambridge University Press.
- Schweinhart, L. J. & Weikart, D. P. (1983). The effects of the Perry Preschool Program on youths through age 15, in Consortium for Longitudinal Studies (Ed.), *As the Twig Is Bent: Lasting Effects of Preschool Programs* (pp. 71–101). Hillsdale, NJ: Erlbaum.
- Schweinhart, L. J., Montie, J., Xiang, Z. et al. (2005). *Lifetime Effects: The High/Scope Perry Preschool Study through Age 40*. Ypsilanti, MI: High/Scope Press.
- Shonkoff, J. P. & Phillips, D. A. (2000). *From Neurons to Neighborhoods: The Science of Early Childhood Development*. Washington, DC: National Academy Press.