

launching preschool 2.0: a road map to high-quality public programs at scale

Christina Weiland

abstract

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Over the last 3 years, publicly funded preschool has been in the policy spotlight. At the federal level, President Obama called for universal access to high-quality preschool for 4-year-old children in his 2013 State of the Union address. Several preschool proposals at the federal level soon followed. Not content to wait for federal action, states and cities around the country have introduced new public preschool programs or expanded existing ones. Preschool is also popular with

the public. A recent survey found that 86% of Americans thought the federal government should help states and local communities build better preschool services and improve access.¹ Preschool, to quote one of the many news articles that have covered it since 2013, is “having its moment.”²

This spike of interest in public preschool is due to a confluence of factors. Science has been one driver. Research across neuroscience, economics, and developmental psychology has converged on the importance of stimulating early childhood experiences and relationships in creating a foundation for lifelong success and on the potential for high-quality early education to

Weiland, C. (2016). Launching Preschool 2.0: A road map to high-quality public programs at scale. *Behavioral Science & Policy*, 2(1), pp. 37–46.

provide this foundation. Family needs are another driver. Large increases in maternal employment over the last several decades, especially among lower income families, have led to increases in rates of out-of-school care early in life.³ At the same time, preschool is not cheap. At a time when average hourly wages have stagnated or fallen,⁴ full-time preschool for a 4-year-old costs an average of \$8,000 in the United States,⁵ or 15% of the nation's average pre-tax family income⁶ and more than 25% of earnings for most families in the lowest two income quintiles. Within a national conversation on rising income inequality, expanded support for public preschool has emerged as one that matches how Americans prefer to give—via provision of direct services.⁷

As preschool has come to the forefront, a healthy debate on its merits has emerged.^{8,9} The debate has focused on two sets of questions. The first set of questions asks, essentially, Is public preschool worth the investment? That is, does preschool improve children's school readiness? Do its benefits last? If so, for how long? Let's call these *Preschool 1.0 questions*.

The second set, or *Preschool 2.0 questions*, focuses on the particulars of program models. Is high-quality preschool scalable? What specific program elements work best at ensuring high quality and promoting strong and lasting gains for children?

Existing research provides an extensive, although imperfect, evidence base for addressing both sets of questions. In this article, I summarize this evidence base. I give particular attention to Preschool 2.0 questions and debate for several reasons. First, regarding Preschool 1.0 questions, given working families' demand and needs, publicly funded preschool is unlikely to go away. 42 states and a handful of cities already have funded their own public preschool programs,¹⁰ and the federal Head Start program serves nearly one million preschoolers.¹¹ Although further expansion is a high policy interest area and there are sizable access gaps by family income,¹² Preschool 2.0 questions are arguably more cross-cutting for policy because they apply to both existing and future programs. Third, the full evidence base on Preschool 2.0 questions is generally less well-known than the Preschool 1.0 question evidence. Most programs are not implementing evidence-based models, and instructional quality in particular is low.¹³ To date, policymakers have not insisted that public preschool programs adhere to the evidence base that details the practices most likely to produce positive

outcomes for children. Using the example of the Boston Public Schools prekindergarten program, where I have been a lead research partner for the past 7 years, I offer a case study of what it takes to implement evidence-based preschool models on a large scale. I conclude by identifying critical areas for new research and discussing the role of policy in raising preschool quality.

Preschool 1.0 Question: "Should we expand?"

Preschool 2.0 Question: "What should we expand and how do we make existing prekindergarten programs better?"

The Preschool 1.0 Evidence Base

There is a large evidence base on the benefits of preschool for participants.^{14–17} In the short term, a recent comprehensive meta-analysis project that analyzed results from 84 rigorous evaluations of preschool programs conducted since 1960 found that, across the great variety of program models, locations, and samples, preschool boosted children's kindergarten readiness by an effect size of a 0.21 standard deviation (SD) for cognitive and achievement skills.¹⁸ (The 0.21 SD estimate is weighted for precision. The unweighted estimate is 0.35 SD.) An effect size is a statistical yardstick that permits comparison of program effects across settings and measures. Researchers tend to classify a small effect as less than 0.4 SD, a medium effect as 0.4 to 0.6 SD, and a large effect as greater than 0.6 SD.

Research on the effects of preschool on children's socioemotional development (that is, positive behaviors showing empathy, cooperation, or prosocial orientations, or problem behaviors such as antisocial, aggressive, hyperactive, impulsive, withdrawn, depressed, or anxious behaviors) has been sparse and the pattern of findings has been somewhat inconsistent.¹⁷ A recent meta-analytic study helped reconcile this evidence. The study found that when improving socioemotional skills is an explicit program goal, there are small, consistent improvements in those skills for children.¹⁹

In the medium term, preschool has shown small to moderate effects in reducing grade retention and special education placement in the kindergarten through 12th grade (K–12) years. A recent meta-analysis found average reductions of 0.29 SD or 10.1

percentage points for grade retention and 0.40 SD or 12.5 percentage points for special education placement.²⁰ Cognitive gains from preschool tend to mostly or entirely fade out by the end of third grade; recent work suggests most of the eventual total decline occurs within 1 to 2 years after preschool.²¹ The mechanisms behind cognitive skill fade-out (or control group catch-up) and the program features that best prevent it are not well understood. Some work suggests the preschool boost is more likely to be sustained if participants have high-quality elementary school experiences.^{22,23} Another study suggests the effects of an early childhood mathematics curriculum lasted into early elementary school only if kindergarten instruction was aligned with preschool instruction.²⁴ It is also possible that having more peers who attended preschool might sustain effects by allowing teachers to teach to a higher skill level rather than focusing on catching up preschool nonattenders.²⁵

In the longer term, rigorous studies that have followed preschool participants into adulthood have found a host of long-term benefits, such as increases in college enrollment, decreases in incarceration rates, and decreases in teen pregnancy.^{26–29} Despite these positive results, these studies may represent a biased sample of all of the studies conducted because studies that fail to show preschool's benefits may have been rejected for publication or never submitted in the first place. Studies that fail to generate positive results suffer this fate often enough that social scientists have a name for it: the "file-drawer problem."

Despite that caveat, as others have pointed out,³⁰ all three available national data sets for studying long-term benefits of Head Start have produced evidence of long-term benefits for participants. Cost-benefit work based on the Perry Preschool, Abecedarian, and Chicago Child-Parent Centers evaluations has suggested that preschool has a robust return on initial investment in the long term, with estimates as high as 10%.^{31–33} There have been at least three "back of the envelope" approximations for Head Start,^{30,34,35} all of which suggest it passes a cost-benefit test.

To estimate effects of preschool on adults, researchers have to wait until preschoolers reach adulthood. Thus, the context of these longer term studies is very different from the context for today's preschools. Today, more children attend nonparental care than did in the past, changing the condition against which

preschool is evaluated.¹⁷ Parenting has also changed: Parents today invest more time and money in their children's learning, on average, than did previous generations.^{36,37} A study of the current-day Tulsa program's likely cost-benefit ratio, using a projection method to extrapolate students' future earnings from their kindergarten test scores, suggests robust returns that are not unlike those of some older studies—\$3 returned per \$1 spent.³⁸ However, the applicability of the results of older, longer term studies to today's policy decisions and the specific drivers behind these effects are open questions. It is not yet known if today's preschool programs will yield benefits to participants and society similar to the benefits provided by programs from earlier decades.

The Preschool 2.0 Evidence Base

What specific program elements work best at ensuring high quality and in improving children's kindergarten readiness? The most important evidence comes from across-study differences in program quality and from studies that have randomly assigned children to different preschool program elements (as compared with business-as-usual preschool). I begin by defining *preschool quality* and then delve into this evidence base.

What Is Preschool Quality?

High-quality preschool tends to be conceptualized in two buckets: structural factors and process factors. *Structural quality* emphasizes broad characteristics of the preschool setting like teacher-to-student ratios, total class size, teacher education and training, and the safety of the classroom for young children. *Process quality* refers to the nature of the interactions between teachers and children and between the children themselves and the richness of specific learning opportunities within the classroom. Given typical input levels in the United States today, structural quality sets the stage for process quality to occur, but it does not guarantee that it will.³⁹

Across-Study Patterns

In practice, measuring quality has been challenging (see the online Supplemental Material for more details). Nonetheless, the existing evidence base on the average effects of a given preschool program versus local alternatives indicates that programs with higher instructional

quality tend to have initially larger benefits for participants, and these larger initial benefits tend to yield larger lasting effects into adulthood, as compared with lower quality programs that have initially small effects.^{27,30,40} (Factors other than program quality are also drivers of the size of preschool impacts on participants, particularly child characteristics and children's likely care settings in the absence of prekindergarten. I focus on program quality for space reasons and because it arguably is the most cross-cutting factor in current policy debates.)

Recent studies have mirrored this pattern of larger, more lasting benefits in programs whose initial benefits for participants are larger. Studies of the benefits to participants in Head Start and the Voluntary Pre-K for Tennessee program found that children with 1 year of preschool had small cognitive and social-emotional benefits. By the end of first grade, nonparticipants in these programs largely caught up to preschool attendees in their cognitive, academic, and socioemotional skills. At the end of third grade, there were no benefits to Head Start participants.⁴¹ The Tennessee study recently found evidence of negative impacts for participants on a summative cognitive measure and on children's mathematics scores.⁴² In contrast, the Tulsa prekindergarten program had initially large benefits on children's literacy skills, moderate benefits on children's mathematics skills, small benefits in reducing children's timidity and increasing their attentiveness, and no effects on children's aggressive or hyperactive behavior.^{43,44} The initial boost in Tulsa on math of 0.38 SD lasted through the end of third grade (0.18 SD) for a cohort that experienced a mature and presumably higher quality version of the program.⁴⁵ Effects on reading did not persist for either Tulsa cohort.

Peeks inside the classrooms of these programs suggest these disparate findings may be due in part to differentials in quality. Data suggest that Head Start structural⁴² quality and emotional quality are good but that instructional quality is inadequate.⁴⁶ In Tulsa, preschool instructional quality was approximately 0.33 SD higher than current Head Start levels⁴⁷ and 0.97 SD higher than Head Start average levels in 2009.^{46,48} The Tennessee study did not use the same instructional quality measure as Tulsa and Head Start, which limits direct comparison of quality levels. However, in a statewide representative study of the Tennessee program, 85% of classrooms did not meet the "good"

benchmark for overall quality. Detailed time-use data collected in these classrooms revealed that children spent more of the school day in whole group instruction (32%) than in more learning-efficacious small-group settings (24%). Children spent 44% of the day in noninstructional activities.⁴⁹

Curriculum and Professional Development Research

Rigorous studies of curricula and professional development over the last decade have found that some approaches work better than others in improving preschool quality and child outcomes. Across diverse contexts and curricula, the strongest route to attaining program quality appears to be coaching by an expert mentor, paired with a domain-specific curriculum that has a specified scope and sequence.³⁹ Having a mentor who observes teachers' in-classroom work with students, troubleshoots problems in teacher practice, and supports teachers' curricular implementation is more effective in changing teacher practices than the usual approach of professional development, which is one-shot workshops. Curricula that support children's natural developmental trajectories via a specific scope and sequence for specific skills appear to be more successful in promoting children's gains in prekindergarten than those that focus on the whole child, without a specified scope and sequence.³⁹ Pairing curriculum and coaching seems to be key. At least one test of coaching without a sequenced curriculum showed improvements in quality, but those improvements were not sufficient to produce impacts on children's cognitive outcomes.⁵⁰

Some studies have tested implementing more than one domain-specific curricula supported by coaching and training and found evidence of positive effects on targeted child outcomes.^{51,52} This is important because preschool programs and teachers are charged with improving children's readiness for school across multiple domains—for example, language, literacy, mathematics, and socioemotional skills, not just literacy skills. Further, children from lower income families lag substantially behind their more advantaged peers across multiple developmental domains,⁵³ and early skills across multiple domains predict later development.⁵⁴ It is interesting that some curricula do have cross-domain effects.^{55,56} The math-focused Building Blocks curriculum, for example, emphasizes having children express

their mathematical ideas and thinking through language. It has shown positive impacts on children's executive function skills and on measures of oral language such as use of complex utterances.

Existing Public Preschool Programs: Models and Quality Levels

The evidence base on preschool quality drivers is still emerging, and very few localities have invested in evidence-based, domain-specific curriculum and coaching supports. Rather, the most popular curricular choices in programs nationally are comprehensive, whole-child-focused curricula.^{13, 57} Some of these curricula show pre–post gains for enrolled children in descriptive research, and some descriptive research suggests some of these curricula may outperform others.⁵⁸ But the rigorous work that exists suggests that they have at best limited evidence of effectiveness in improving children's kindergarten readiness.⁵⁹

The What Works Clearinghouse, which reviews rigorous studies of preschool curricula and gives each curriculum an effectiveness rating, rates one of these common choices—Creative Curriculum—as having an effectiveness rating of zero for children's mathematics, oral language, phonological processing, and print knowledge skills.⁶⁰ Yet, on a recent list of approved curricula for state-funded preschool programs, Creative Curriculum was the curriculum most frequently mentioned.⁶¹ It was also the most commonly used curriculum in Head Start in 2009⁵⁷ and the second most commonly used curriculum in an 11-state study of prekindergarten.¹³

As for professional development models, data on large-scale systems are neither available nor tracked. Traditionally, teachers are supported through training, often with a specific number of hours required per year.

There has been no published research on how program model decisions are made across localities. One possible reason for the choice of comprehensive curricula maybe the requirement in many places to have curricula that cover all child developmental domains—the historical whole-child focus in early childhood.⁵⁹ Another reason may be program requirements for teachers and programs to collect data on children's progress, because some comprehensive curricula are paired with specific collection tools and, in 2014, curriculum-paired tools were among the most

commonly approved for fulfilling child assessment requirements.⁶¹ In addition, simple familiarity and history may play a role. Domain-specific curricula are generally newer than comprehensive curricula, meaning staff who make curriculum decisions are less likely to have experience with them. Today, no preschool policy requires the use of evidence-based curricula.

Regardless of the reasons behind local programmatic decisions, the net result of current choices—of which curricula and professional development are just two—appears to be mixed in terms of the quality experienced by enrolled children. Structural quality and emotional climate are at levels considered good by experts.⁴ Programs score poorly, however, on instructional quality—the aspect of quality that appears to matter most for children's cognitive gains in preschool.⁶²

Improving Quality and Outcomes at Scale: The Boston Prekindergarten Program

The Boston Public Schools prekindergarten program, which I have investigated with colleagues since 2007, is a notable exception in its curricular and professional development choices and investments. In 2007–2008, Boston implemented two domain-specific curricula supported by biweekly coaching by expert, experienced former teachers across district prekindergarten classrooms. After 2 years of implementation, this program model produced meaningful impacts on targeted (language, literacy, mathematics, and socioemotional skills) and nontargeted skills (executive function).⁵¹ Impacts on children's vocabulary and math skills were the largest across rigorous evaluations of the effects of large-scale, public prekindergarten programs. Effects were particularly pronounced for Hispanic students, dual-language learners, children from low-income families, and children with special needs.^{51, 63}

Although Boston is a single district, it is a large one, with historically stubborn achievement gaps. As a case study, its story offers several lessons for scaling high-quality preschool, which I describe below.

Structural Quality Investments Are Not Enough

From the program's beginning in 2005, Boston made strong investments in structural quality. Under policies unusual for prekindergarten, teachers were paid on the same scale and were subject to the same educational

requirements (state certification and master's degree within 5 years) as K–12 teachers. In practice, this meant that by 2008, the majority held master's degrees and were paid a base salary of approximately \$60,000 per year, per the district's K–12 salary schedule. Classrooms were also staffed by a paraprofessional, bringing the maximum adult-to-child ratio to 1:11. The program was based entirely in public schools. The program was open to all children in Boston via a lottery assignment system. Consequently, many classrooms were mixed income, an approach we later found to be associated with stronger vocabulary and executive function gains for children in the program (versus low-income only)⁶⁴ There was no consistent program curriculum or coaching system.

Despite these unusually strong structural investments, researchers at the Wellesley Center for Women found that process quality—particularly instructional quality—was low in the first few years of the program.⁶⁵

Implementing Curricula and Improving Quality at Scale

Following the Wellesley report, Boston slowed down the planned pace of expansion and upped the district's investment in program quality. With consultation from experts, the Boston Public Schools Department of Early Childhood selected two domain-specific curricula already in place and working well in some district schools: the language and literacy curriculum *Opening the World of Learning* and the mathematics curriculum *Building Blocks*. The district created an integrated curricular guide for each unit, with concrete guidance on how to implement *Opening the World of Learning* and *Building Blocks* together. They also made sure teachers had all of the materials they needed to implement the curricula at high levels,⁶⁶ such as specific items for center time that reinforced the unit theme or specific vocabulary being taught.

Teachers received support in implementing these curricula from training sessions (13 days total, in the summer and across the school year) and from approximately biweekly visits from expert coaches. The coaches were free to focus on any areas where the teachers' practice needed support. For some, this could mean considerable attention to classroom management before focusing on the curricula. For strong teachers,

this could mean extending the curricula beyond what was written to go deeper into a group of children's particular interests.

In data collected 2 years after Boston's quality investments, Boston preschool classrooms showed the highest average instructional quality of a large-scale program to date: 1.7 to 2.4 SDs higher than current Head Start quality nationally. (The SD range is due to the choice of SD used in the comparison. Boston's CLASS [Classroom Assessment Scoring System] Instructional Support score average was 4.3 and its SD was 0.84,⁶⁷ whereas the analogous mean and SD for Head Start were 2.9 and 0.58, respectively.⁴⁷) Quality data were used at the district level to pinpoint and target particular district weaknesses. Scores were not used to reward or punish teachers; they were used for program decisions and improvement only.

Research as a Tool for Program Building

Another hallmark of the Boston program has been its strong emphasis on data-driven decision making—for example, changing course on the basis of quality data, choosing strong curricula that resonate locally, and partnering with researchers both to study specific program elements and on internal efforts that informed specific decisions. Research in Boston has not been a tool just for grading the preschool's effectiveness but for building the program—an approach that continues in Boston's current efforts to align its preschool to grade 3 (P–3) curricula and professional development and in the expansion of its models into community-based centers in Boston.

Moving Forward: Research and Policy Implications

Despite the considerable learning over the last few decades, there are critical areas of need for more research. More research is needed on the contributions of other potential active ingredients in preschool programs besides curriculum and professional development, including rigorous research that randomly assigns children to preschool classrooms with different peer conditions (for example, all low-income backgrounds versus a mix of income backgrounds) and that compares teachers paid on the same scale as

K–12 teachers with those paid considerably less. More work is needed on creating and testing new integrated, domain-specific curricula, such as the National Science Foundation–funded Connect4Learning curriculum, which was developed by experts in mathematics, language, literacy, science, and socioemotional development. There is also a need to integrate existing, separate domain-specific curricula to streamline logistical implementation barriers for programs. Also needed is more research on how program models operate differently under different auspices and trade-offs of one auspice versus another. As others have argued, more research is needed on which early skills are the most critical to develop in preschool¹⁸ and on more effective ways to measure quality.⁶²

Advancing the science of preschool education also necessitates research on preschool for 3-year-olds and on the after-preschool years. Increasingly, children enter preschool at age 3 years.³ To date, there has been very little research on optimal experiences and sequencing of instruction for 2 years of preschool. Also needed is more research on the mechanisms of catch-up and fade-out, a need that stands to be partially filled by an upcoming investment in an Early Learning Network by the Institute of Education Sciences, which includes Boston as a study site. Rigorous tests of P–3 models to support children’s early learning are needed, as no proven P–3 models currently exist.

However, in the current absence of answers to these and other important questions, existing public preschool programs and policymakers are faced with doing the best they can with today’s evidence. At this juncture, on the basis of decades of research, it is known with great confidence that high-quality preschool increases children’s school readiness. There are wide income-based disparities in access to quality prekindergarten programs nationally and in kindergarten readiness, gaps that expanded access to publicly funded preschool can stem.³ Research from past models suggests benefits can last into adulthood. Given differences in today’s context versus the contexts of the older studies, there is no ironclad guarantee that expanding access to high-quality public preschool today will benefit participants and society in the long run. Results so far are consistent with those of previous studies—universal fade-out of the boost on cognitive test scores in K–12, more lasting

effects in the medium term in higher quality versus lower quality programs, and a robust projected return on investment.

Also known is that most public preschool programs are not making programmatic decisions that match the current science. Here, policy can play an important role in requiring programs to choose proven curricula and professional development models and to update their decisions to align with new findings. Also needed are new national quality standards that track additional proven and potential active ingredients, including which curricula are used, with what specific supports for teachers; whether preschool teachers are held to the same standards as K–12 teachers and whether they receive the same pay; and the socioeconomic composition of children’s peers. Ultimately, the potential for preschool to improve the life prospects for young children depends on following the evidence not just on whether society should invest in preschool but regarding the more neglected question of how to implement specific program elements at scale. The devil is in the details; the debate should be, too.

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Thanks to Boston families, teachers, principals, Boston Public Schools district staff (particularly Jason Sachs, Brian Gold, and early childhood coaches), and the Wellesley Centers for Women. Thanks also to Abt Associates for their partnership in Boston research and to my Boston research collaborators, Hirokazu Yoshikawa, Rebecca Unterman, and Monica Yudron. Finally, thanks to the Institute of Education Sciences for supporting Boston prekindergarten research. Any errors are my own.

supplemental material

- <https://behavioralpolicy.org/journal/>
- Supplemental Text
- Additional References

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