



POLICY REPORT

Tempe PRE: Insights into a New Publicly Funded Preschool Program

July 2024

TempePRE

Heli@s[®]
Education Foundation

***NORC** at the
University of
Chicago

We would like to thank the large team that made all of this work possible. This study was a 6-year endeavor and benefited from numerous NORC researchers and staff (past and present) who supported the development of, data collection for, and analysis and meaning-making from this study: Mitch Barrows, John Francis, Eileen Graf, Melissa Gutwein, Eric Hedberg, Julie Kubelka, Carrie Markovitz, and Lekha Venkataraman.

An extreme amount of gratitude also goes to our funders and thought and implementation partners in Tempe, AZ: Julie Norwood, Paul Perrault, Kelly Koenig, Michelle Conroy, and Karen Ortiz at Helios Education Foundation and Marie Raymond, Alicia Tunstall, Catalina Rodriguez Alvarez, Allison Burke, and Dreamlyn Johnson who have been involved in running the Tempe PRE program over these years. This work is only as valuable as it is because of your continuous engagement with our team and genuine interest in what we could all learn from our research.

We also thank all of the Tempe Elementary School District staff who shared their expertise with us, provided crucial data, and continuously expressed interest in this work: former Superintendent Christine Busch, current Superintendent Dr. James Driscoll, Brandie Burton, Tracy Harvester, Amy Minniear, and Jennifer Whittington.

And last but not least, to all the teachers, parents/caregivers, students, and principals who invited us into their schools and classrooms and shared their experiences with us.

Suggested citation:

Ehrlich Loewe, S. B., Carrazza, C., Kabourek, S., Gordon, M. F., Hernandez, M. W. (2024). *Tempe PRE: Insights into a new publicly funded preschool program*. Chicago, IL: NORC at the University of Chicago.

NORC at the University of Chicago Authors: Stacy B. Ehrlich Loewe, Cristina Carrazza, Sarah Kabourek, Molly F. Gordon, and Marc W. Hernandez

Table of Contents

1 Key Findings

3 Policy Context

5 Introduction

7 Overview of the Tempe PRE program

9 Methods

10 2021-2022 Implementation Evaluation

10 2022-2023 Impact Evaluation

11 Who was included in the impact study?

11 2024 Post-study Parent and Teacher Reflections

12 Findings

13 How Well was Tempe PRE Implemented?

13 Overall, teachers implemented the majority of the HighScope curriculum with fidelity. This included incorporating child-directed learning, implementing positive behavior management, and executing conflict resolution approaches that involved child input.

18 Teachers and families had strong communication and positive relationships

20 Tempe PRE teachers had strong training and supports, although consistency broke down during COVID

23 What Impact did Tempe PRE have on Families and Students?

23 Tempe PRE offered parents new opportunities around housing, employment, and schooling

23 Students' kindergarten outcomes suggest Tempe PRE may positively prepare students for kindergarten

29 Key Takeaways

32 Appendices

33 Appendix A: Implementation Evaluation Methods

33 Sample and selection of schools and classrooms

33 Primary data collection

34 Implementation evaluation analyses

35 Study methodological limitations

35 Appendix B: Impact Evaluation Methods

35 Sample

37 Measures

37 Data collection

38 Data analysis

38 Appendix C: Post-study Parent and Teacher Reflection Meetings

38 Parent meeting

39 Teacher meeting

39 Appendix D. Emotion Regulation Checklist (ERC)

40 Appendix E. Impact Estimation Regression Tables

43 Endnotes

Key Findings



Tempe PRE was designed as a high-quality preschool program to create more opportunity for children in Tempe. In the 2021-2022 school year, we at NORC at the University of Chicago conducted an evaluation of Tempe PRE to understand how the program was being implemented and its effects on children and families. We also collected students' outcome data the following year once they entered kindergarten to measure impacts on achievement compared to a control group.

Our primary findings are as follows:

- Classroom observations showed that Tempe PRE teachers implemented the majority of the HighScope curriculum—the program's curriculum of choice—with fidelity. This included incorporating child-directed learning, implementing positive behavior management, and executing conflict resolution approaches that involved child input.
- Tempe PRE offered parents new opportunities around housing, employment, and schooling.
- Student's kindergarten outcomes suggest Tempe PRE may positively prepare students for kindergarten.
 - Tempe PRE students started kindergarten with higher receptive vocabulary and grew faster than their control group peers over the kindergarten year.
 - Tempe PRE students had stronger emotional regulation and were better able to verbalize their emotions compared to peers who were not selected to attend Tempe PRE.
- Principal, teacher, and family perspectives aligned with what we observed and the outcome data we collected, particularly around preparing children for kindergarten.

This evaluation documented the successful early installation of a high-quality preschool program that was designed to provide novel access to children from low-income households who would not otherwise have had such an opportunity in their community. Through close collaboration among multiple local government and philanthropic partners, and with a strong, common commitment to quality, the Tempe PRE program was structured and implemented with key components hypothesized to produce positive child outcomes.

Policy Context



Across the nation, as of 2019, 47% of children aged 4 from low-income backgrounds were not enrolled in a preschool program.ⁱ As a state, in 2023 Arizona ranked 43rd of 45 states in terms of the proportion of 4-year-olds enrolled in state preschool and the 26th in terms of its spending on children for preschool.ⁱⁱ In some locales, there are very few options for families to enroll their children in an early care and education (ECE) program. One location that had very few options for families until recently was Tempe, AZ. In this city, the eighth largest in Arizona, the poverty rate among year-round residents is high (18.2% in 2021ⁱⁱⁱ compared 11.6% nationally^{iv}). Within this context, a study conducted in 2017 noted that only one-third of 3- and 4-year-old Tempe children were enrolled in preschool.^v The study concluded that “...there are hundreds of young children in Tempe who could benefit from high-quality preschool but who do not have the opportunity to attend.” (p. 2). Of almost 1,400 low-income 3- and 4-year-olds in the area, only 278 had an option available to them, leaving 1,118 children unserved.

In that same year—2017—the City of Tempe voted to invest \$3 million per year into a two-year pilot program for a new preschool program: **Tempe Preschool Resource Expansion (Tempe PRE)**. The program would initially place 20 classrooms in two school districts, Tempe Elementary School District (Tempe EI; 18 classrooms) and Kyrene School District (2 classrooms). During the COVID-19 pandemic, the number of classrooms was reduced to 11 to account for budgeting needs across the City, with all embedded within Tempe EI. The program received annual approval for ongoing funding until 2023, when the city council approved permanent dedicated general fund support.

A local foundation, Helios Education Foundation, provided the funds for an external, independent research evaluation to be conducted in the early years of Tempe PRE’s implementation. NORC at the University of Chicago (NORC) conducted the research, which spanned from 2018 through 2024. Between 2018 – 2020, NORC and Tempe partners—including the City of Tempe, Helios, First Things First (AZ’s voluntary Quality Rating and Improvement System for providers of center-based or home-based ECE), and the Tempe Elementary School District—developed a logic model and identified key components and anticipated outcomes of Tempe PRE. NORC conducted early classroom observations; interviewed teachers, principals, and parents; and examined existing data collected by Tempe PRE and the school district. As the nation emerged from the COVID-19 pandemic, NORC and the City of Tempe worked together to implement a randomized lottery for families applying to Tempe PRE in the spring/summer of 2021. Over the next two years, NORC studied how Tempe PRE was implemented and tracked participating children into kindergarten to study the impact of the Tempe PRE program.

Introduction



Beginning in the 2017-18 school year, the City of Tempe, Arizona, supported implementation of a new, publicly funded preschool program, the Tempe Preschool Resource Expansion (Tempe PRE). This brief presents findings from NORC's implementation evaluation of Tempe PRE's fifth year of operations and an impact study of Tempe PRE on students' outcomes when in kindergarten.

We begin with an overview of the Tempe PRE Program and the evaluation, followed by the analytic methods, findings on students' kindergarten early literacy and social-emotional skills.

How a city, district, and foundations came together

In 2015–2016, several key stakeholders across the city worked together to meet the growing needs of the Tempe community. The City of Tempe, along with the following partners, created Tempe PRE.

Each key partner contributed to the program in different, but complementary, ways:

- **City of Tempe:** The city provided funding and oversight for the Tempe PRE program as well as access to before- and after-school care for eligible families. They provided ongoing training and supports to Tempe PRE teachers
- **Tempe Elementary School District:** The school district provided physical space for Tempe PRE classrooms, employment for Tempe PRE teachers and instructional assistants (IAs), professional development and training, and school-level supports for all Tempe PRE classroom teachers^{vi}
- **The Virginia Piper Foundation:** Piper provided seed funding for professional development for all Tempe PRE teachers in the early years of implementation
- **Helios Education Foundation:** Helios funded NORC at the University of Chicago to independently evaluate Tempe PRE

Leveraging the common, complimentary goals of early childhood stakeholders across the city of Tempe enabled the creation of a program that met a crucial need for high quality preschool in the community. With Tempe PRE imagined and created, these partners then engaged with other organizations, such as First Things First, that provided supports directly to the program.

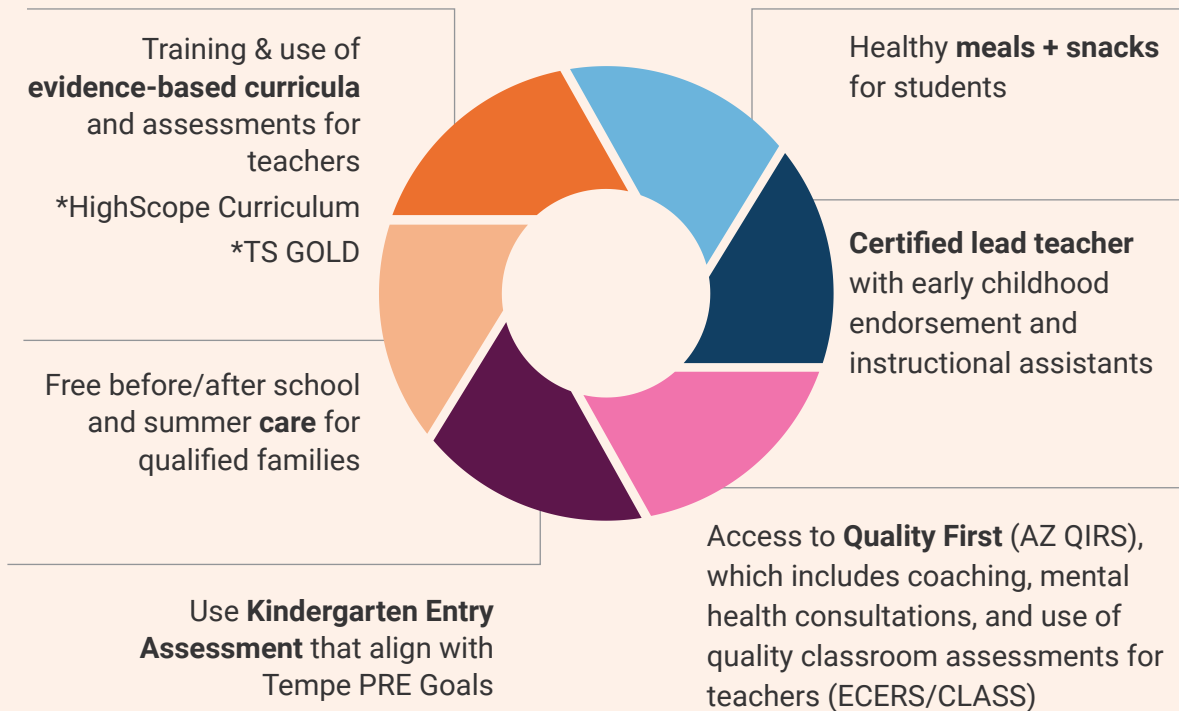
Overview of the Tempe PRE Program

Tempe PRE was designed to be a high-quality preschool program with low teacher-child ratios (1:9), reliance on an evidence-based curriculum (i.e., HighScope) and assessments (e.g., TS GOLD), and staffed by certified, early childhood teachers and trained instructional assistants (see **Figure 1**).

Tempe PRE’s structural components



Figure 1. Tempe PRE’s quality components



The Tempe PRE developers selected HighScope as the curriculum for the program because it is a developmentally appropriate, evidence-informed curriculum that prioritizes student-directed learning (Epstein & Hohmann, 2012). Teachers in Tempe PRE classrooms followed the HighScope curriculum's schedule and structure. All new teachers were trained to implement HighScope with fidelity and receive refresher training sessions in future years. As a result, the study team hypothesized that Tempe PRE would lead to better kindergarten preparation. Some key components of the HighScope curriculum that were emphasized through training and coaching include:

Some key components of the HighScope curriculum that were emphasized through training and coaching include:

- Active learning
- Student choice
- Small group time and individual work/play time
- Social-emotional skills
- Using verbal language, particularly around social-emotional experiences
- A conflict resolution process that involved children in describing experiences and identifying solutions

Tempe PRE expects teachers to insert content throughout the day aligned with the Arizona Early Learning Standards (AzELS) and implement an instructional approach that is primarily child-led and play-based. The schedule consists of set activities: greeting time, message board, planning time, work/free play time (sometimes called "choice" time), recall time, small-group instruction, large-group instruction, transitions, outdoor/recess, and meal/snack time.

Methods



2021-2022 Implementation Evaluation

To understand what students in Tempe PRE classrooms were experiencing, and how teachers were implementing the program, NORC considered the following research questions:

1. To what extent are the components of Tempe PRE implemented with fidelity to a central program model?
2. How are teachers, principals, and families experiencing the Tempe PRE program?

To address these topics, we conducted interviews with teachers, principals, and parents and collected classroom observation data during the 2021-22 school year. These included:

- 6 Tempe PRE classroom observations across 4 schools, out of a total of 11 classrooms across 7 schools
- 6 principal interviews across 6 schools^{vii}
- 7 Tempe PRE teacher interviews across 6 schools
- 14 Tempe PRE parent interviews

Our observations were particularly focused on the extent to which teachers were implementing the HighScope curriculum with fidelity. Interviews asked about perceptions of kindergarten readiness, staff experiences with professional support, and family engagement. See **Appendix A: Implementation Evaluation Methods** for more information on the study methods.

2022-2023 Impact Evaluation

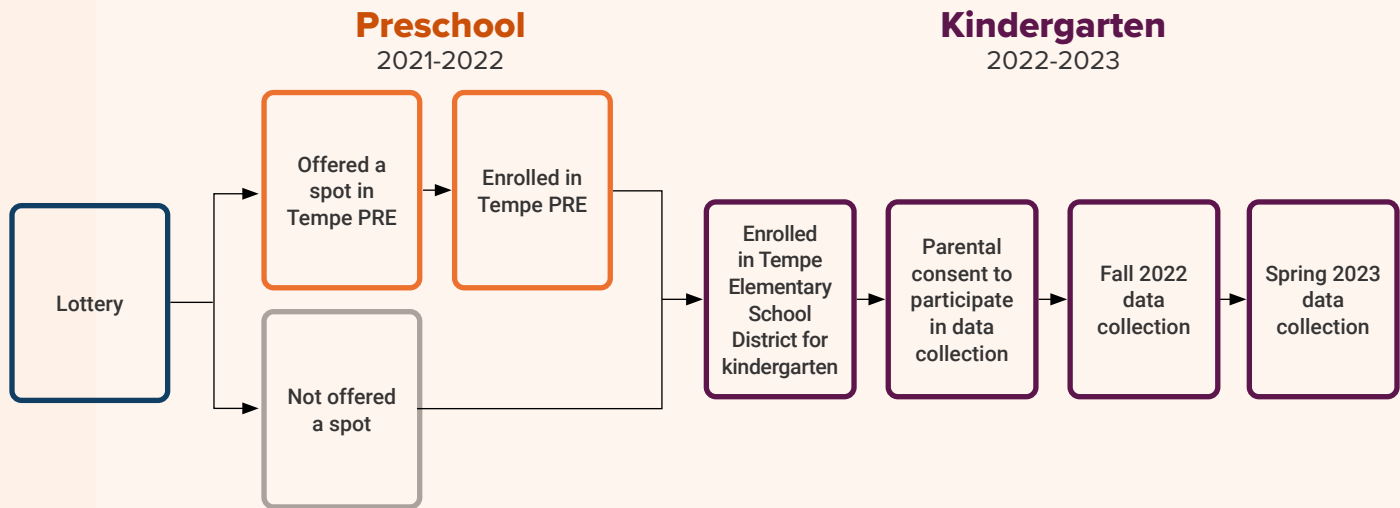
In addition to understanding implementation, our study collected independent outcome data to assess the potential impact of the Tempe PRE program on student outcomes. We asked:

What impact does Tempe PRE have on preschool students':

- Early literacy skills at both the beginning and end of kindergarten?
- Early social-emotional skills at both the beginning and end of kindergarten?

In other words, we assessed the success of Tempe PRE by examining (1) students' kindergarten readiness, through beginning-of-kindergarten early literacy and social-emotional skills and (2) their skill growth during kindergarten—or changes from the beginning of kindergarten to the end of kindergarten—in terms of their early literacy and social emotional skills.

Tempe PRE city staff conducted a lottery for admission to their 2021-2022 program year. **Figure 2** maps the timeline of the randomized control trial that allowed NORC to estimate the impact of Tempe PRE on students' kindergarten readiness and end-of-year kindergarten skills. Students' early literacy and social-emotional skills were measured in the fall and spring of their kindergarten year (2022-23).

Figure 2. Evaluation enrollment timeline

Who was included in the impact study?

Students had to meet three key requirements to be eligible for the study: meet Tempe PRE’s eligibility requirements for full-tuition coverage, apply to Tempe PRE via the lottery, and subsequently enroll in Tempe Elementary School District for kindergarten. This resulted in an analytic group of 83 kindergarten students—43 students in the intervention group (who were offered Tempe PRE through the lottery and enrolled) and 40 students in the control group (eligible students who were not offered Tempe PRE through the lottery). See **Appendix B: Impact Evaluation Methods** for more details. As shown in **Table B-1**, the number of students available for kindergarten assessments was substantially lower than the number of students who were eligible when attending Tempe PRE. This is due to a large number of students who did not subsequently enroll in the Tempe Elementary School District as kindergarten students.

2024 Post-study Parent and Teacher Reflections

In February 2024, the research team held two participatory meetings—one with current family members of Tempe PRE students and one with Tempe PRE teachers. During this time, we shared findings from the project and sought reflections and feedback from those who attended our meetings (see **Appendix C: Post-Study Parent and Teacher Reflection Meetings**). While not originally part of our evaluation, bringing in the perspectives of current family members and teachers can provide a more wholistic picture of the Tempe PRE experiences. Therefore, throughout the findings in this report, some quotes reflect what we heard during these meetings to help contextualize the quantitative findings presented.

Findings



How Well was Tempe PRE Implemented?

Overall, teachers implemented the majority of the HighScope curriculum with fidelity. This included incorporating child-directed learning, implementing positive behavior management, and executing conflict resolution approaches that involved child input.

To evaluate the fidelity of implementation to the HighScope curriculum, we visited 6 of the 11 Tempe PRE classrooms for three hours in the morning. Overall, average scores across the six classrooms were rated relatively high for each portion of the day observed.

Hearing Directly from Teachers

Some teachers shared their experiences with the HighScope curriculum and a shift away from teacher-directed, worksheet-based instruction.



There's always that temptation where they should be teaching ABCs...Maybe if I gave them a worksheet that they trace. And it's just like, no, that's not HighScope. Let's...think of some other ways to do that. So we've done the... shaving cream, the letters in shaving cream, and it's neat to see just how much they love that when that shaving cream comes out, and... they get to know their letters, and they just really love that."

—TEACHER (2022)



While teachers were trained in the use of HighScope as their primary curriculum, some shared their desires for less open-play and additional instructional materials and approaches.

I definitely feel that Tempe PRE should incorporate more things in the curriculum, not only HighScope, but other things that helps get [children] ready... Like instead of two hours or three hours of free play, maybe one of the hours we can do some of that free play, but maybe those next 30 minutes, we can talk about shapes while using playdough. —TEACHER (2022)



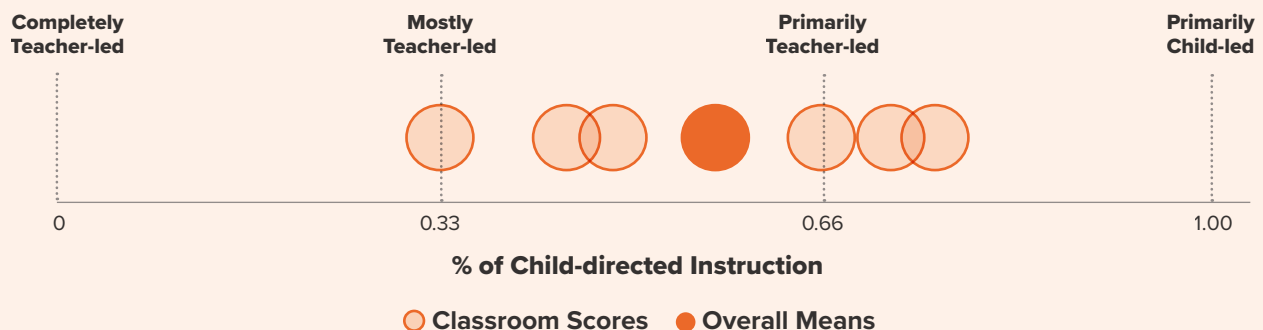
Child-directed learning

A central element of the HighScope approach is allowing children to guide their own learning. As we observed each portion of the morning, we rated the degree to which each portion was primarily child-focused versus completely teacher-led. Classrooms were scored during each portion of the day, and then their “child-directed” scores were averaged across all portions of the day to obtain an overall score. The options, their descriptions, and the corresponding score we assigned to each rating were:

- **Completely teacher-led:** Teachers impose their own ideas of what children should be learning and doing (score = 0.00)
- **Mostly teacher-led:** Activity is directed by teacher, with a small amount of room for child input and choice (score = 0.33)
- **Somewhat teacher-led:** Adults sometimes encourage and support children’s strengths and interests; at other times, there is intentional space for children to exert their interests and choices (score = 0.66)
- **Primarily child-focused:** Teacher is consistently encouraging and supporting children’s interests and choices (score = 1.00)

Based on the findings in **Figure 3** Tempe PRE classrooms fell somewhere in the middle, where instruction was not ever “*completely teacher-led*” and not ever “*primarily child led*.” However, in three of the six classrooms observed, there was more room for child-directed learning.

Figure 3. Some classrooms included child-led learning time



Hearing directly from parents

Some parents saw HighScope as providing a more structured curriculum than some other preschools or child care settings used:



One of the things we loved the most is that there is more of like a curriculum for them, it’s not just play all day. There is play, but they are actively learning things and that is what we were looking for for [our child]. We wanted her to learn. **-PARENT (2024)**



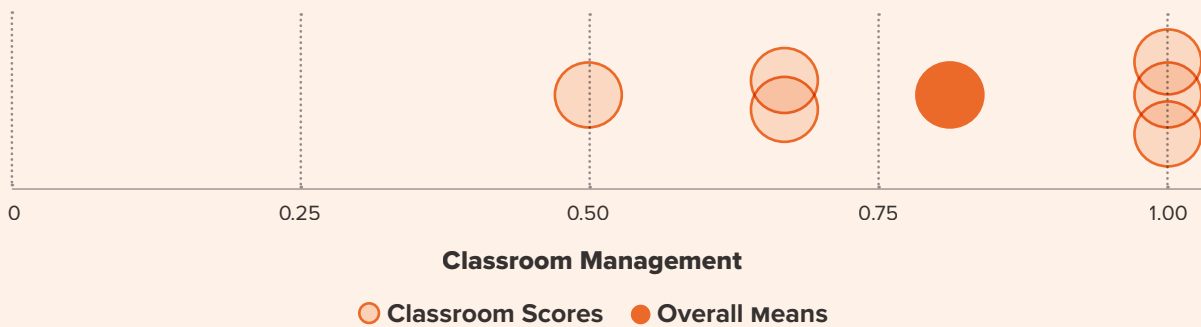
Classroom behavior management

A tenet of a well-functioning early childhood classroom is that children have clear expectations and rules set up, while also having the space to move and express themselves. High quality classroom management often includes approaches teachers take to help *prevent* behavior disruptions—not just their reaction to disruption when it occurs.^{viii} We assessed Tempe PRE classrooms for their level of classroom management by rating each of the following statements as *yes (1.00)*, *somewhat (0.50)*, or *no (0.00)* over the 3-hour observation period:

- **Behavior expectations are clear**, and the teacher has established consistent rules and expectations.
- **The teacher has established clear routines** and students know what is expected of them.
- **The classroom is in a state of “organized chaos,”** with enough freedom for children to individually display their interests and ideas but within expectations for appropriate behavior and interactions with one another.

The six teachers observed in 2021-22 received an average score of 0.81, with scores ranging from 0.50 to 1.00. Three teachers earned a perfect score for classroom management. As shown in **Figure 4**, the average score for classroom management was high, with all sampled classrooms in 2021-22 scoring at or above 0.50. This is particularly notable given the behavioral challenges associated with the COVID-19 pandemic.^{ix}

Figure 4. Classroom management scores were high



Conflict resolution process

Related to behavior management, we also observed how Tempe PRE teachers approached conflict resolution among students. HighScope has a specified process for approaching and addressing conflict resolution (see box to the right). The key components of HighScope's conflict resolution process involve approaching conflicts as though they are normal rather than a problem, helping to diffuse the conflict calmly and by acknowledging feelings. The teacher or instructional assistant should involve the students in identifying the problem, how they felt due to the conflict, and in generating a solution to the conflict.

To assess fidelity to the HighScope conflict resolution process in a classroom, we recorded scores for each of the following items during each observed portion of the day, if we observed a conflict. The items were scored as *yes* (1.00), *sometimes* (0.50), or *no* (0.00):

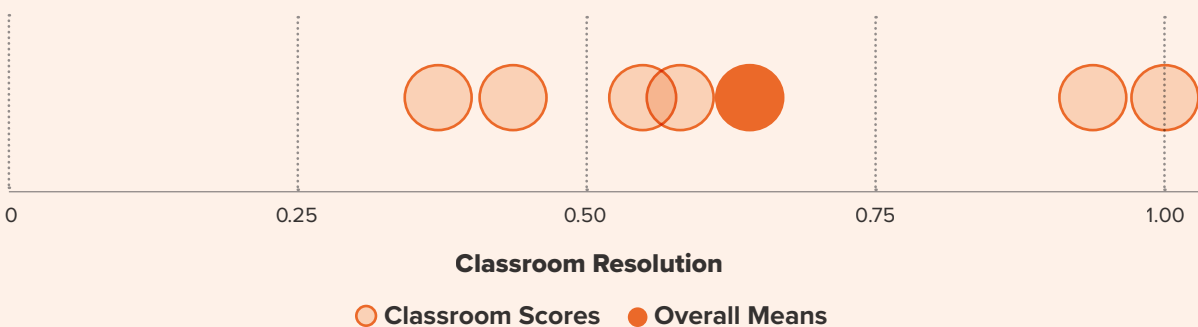
1. **The lead teacher approaches conflicts as a matter of fact**, rather than a problem.
2. **Teachers help diffuse conflicts**, approaching calmly and acknowledging feelings.
3. **Teachers involve children in identifying** the problem.
4. **Teachers involve children in the process** of finding and choosing a solution for a problem.

Overall, classrooms received an average rating of 0.65, with individual classroom average scores ranging from 0.37 to 1.00. Two teachers earned very high scores of 0.94 and 1.00, while the other four teachers earned scores around 0.50. Teachers with lower scores were less likely to involve children in identifying the problem or to involve children in finding and choosing a solution.

HighScope's conflict resolution process

- 1 Approach calmly, stopping any hurtful actions
- 2 Acknowledge students' feelings
- 3 Gather information
- 4 Restate the problem
- 5 Ask for ideas for solutions and choose one together
- 6 Be prepared to give follow-up support

Figure 5. Some conflict resolution scores were high



Hearing Directly from Parents



[My child's] vocabulary and how talkative they can be, and the extent to what they're talking about and what they can convey. The other thing, about the conflict resolution, our kid has had to work on respecting boundaries ... and the way that the program and his teacher have sent information home and told us what they are doing and how they are trying to mitigate that issue has been very helpful, very upfront and clear. And we like how they are handling it. Like there is a solution in mind, and they call us and we feel involved so that has been very nice."

—PARENT (2024)



"[My child] is able to say 'I'm mad!' and if she is, she gives a couple minutes and she is better than she was."



—PARENT (2024)

Teachers and families had strong communication and positive relationships.

Children are more likely to succeed academically when their families are engaged with their teachers and school.^x Within Tempe PRE, teachers described having open communication with parents to keep them updated on their child's progress. The majority of teachers mentioned chatting with parents every day during drop-off and pick-up times and during parent-teacher conferences. They also used platforms, such as ClassDojo, to share daily updates on classroom activities with parents.

When asked to share what they liked most about their child's classroom, 10 out of 14 parents interviewed in 2022 referenced their child's teacher. The parents explained that the teachers are very kind and communicative.



Hearing Directly from Parents



Teachers [communicate] on a daily basis. It is incredible ... [whether] it is a message through Class Dojo, or when we sign [our child] out they are talking to us and letting us know how the day was. As well as just the size of the class, there [are] more smaller groups and being able to have that contact with the kid and get to know them. It's not just a kid in the class. They know them by name, they know their boundaries.” **-PARENT (2022)**

Hearing Directly from Teachers

“I feel like [the updates are] helping the parents. It's helping them understand who their kids are. As teachers, when we collect that data, we share it with them during...sit downs and conference time. And we get to share how beautiful their kids are. And I feel like it's impacting them to be even more...in tune to their child and know their strengths and weaknesses.” **-TEACHER (2022)**



Teachers also shared how they consider, not only the children in their classrooms, but also the needs of their families. For example, they met with each family prior to the start of the year and sought out information about resources those families need.

Both teachers and principals reported that family engagement was a challenge during the COVID-19 pandemic because parents were not allowed on campus. While they tried to maintain communication online, most noted that this was a poor replacement for daily interactions. The communication improved once children and parents could come back to the school in-person. As one teacher said, “We’ve been pretty limited with COVID. But now... our parents can come on campus and sign in and out. So right there’s engagement with our teachers.”

Hearing Directly from Teachers



We meet each family during orientation. Each family, 30 minutes. Do you have questions? Is there anything I can do for you? ... I always say to families, ‘This child is going to be fine; I don’t have any concerns. The child is going to be in school and they have their meals, they have their naptime, they are going to be fine. What about you?’ Honestly, there are some parents or families – they are struggling, and we have resources... I love that about Tempe PRE; we are not only providing the preschool program for the kids, but we provide services for the families.”

—TEACHER (2022)



Hearing Directly from Parents

“Especially [Teacher Name], she’s the one that is with him the most. She’s super nice. She’s always been very affectionate with him, very attentive. She’s always aware of what he needs or anything. And she and I maintain a good communication. So, I like that... she keeps me on the loop and above all, that my boy feels comfortable and at ease



—PARENT (2022)

Tempe PRE teachers had strong training and supports, although consistency broke down during the COVID-19 pandemic

When asked in 2024 what keeps teachers teaching in Tempe PRE, we received a range of responses that were consistent with Tempe PRE's original logic model. The most frequently shared response was "good resources." These included administrative support, supplies, manipulatives, and the HighScope curriculum itself. One teacher noted, "I like [the] new HighScope curriculum books to help with lesson planning." while another noted, "HighScope isn't heavily scripted, so I can adjust my activities and lessons to fit my students' needs and interests." Other motivations for being a Tempe PRE teacher were the relationships, including students themselves, relationships with their parents, and the teamwork amongst colleagues. Lastly, one teacher noted that both the capacity cap within the classrooms and the salaries (at the level of a certified district teacher) as contributing factors to remaining with the Tempe PRE program. That said, one other teacher noted that the pay could be better.



Hearing directly from Teachers

“Anything that I need, on any topic or suggestions, what are they doing at different sites, she is always there to provide me information [or] to help me out if I’m struggling with something.”

—TEACHER (2022)

“I think [coaching] has helped me to become a better teacher, but I feel like it will be nice to have more coaching, you know, because it stopped for a couple of months.” —TEACHER (2022)

Hearing Directly from Parents

“One [thing] I’ve seen from places we’ve been before – [at Tempe PRE] we have never had a new teacher. The turnover rate is so low, and we have gone on playdates with kids from past schools and they’ll say, oh yeah there is another new assistant, new teacher, and we didn’t. —PARENT (2024)



Indeed, the original design of Tempe PRE called for training in HighScope and Teaching Strategies GOLD (TSG) assessments, along with Quality First coaching. When asked to describe the types of supports received over the 2021-22 school year, Tempe PRE teachers from all participating schools described attending weekly Professional Learning Community sessions (PLCs) on Friday afternoons. Teachers also completed Growing as Professionals (GAP) trainings and met with a Quality First coach on a monthly basis, when possible. Other supports, including general principal support and participation in school-based professional development opportunities, varied from school to school. Teachers were also supported by Tempe PRE (city) administrators. The trainings that had been offered in years past had largely been put on hold during the COVID-19 pandemic. One teacher noted, “This is the first year that we haven’t got a lot of training, to be honest.”

Hearing Directly from Teachers



But one thing that I do remember from other years is that we talked about behavior, storytelling. We talked about how to ask open-ended questions while you’re reading a book. I thought that that was like so interesting. You know, I wish we had those things this year, but we haven’t.



—TEACHER (2022)



Teachers across every school also described their coaching as inconsistent during the 2021-22 school year due to the pandemic. Teachers met with their coaches less frequently due to COVID-19 restrictions and illness. Nevertheless, reviews of the coaches themselves were generally positive. Teachers noted that their coaches helped them prepare for evaluations, improve their classroom set up, and better utilize their screener tools.

Despite the adjustments that schools needed to make during the COVID-19 pandemic, multiple teachers described robust trainings in HighScope and TSG during the first few years of Tempe PRE implementation. During 2022 interviews, teachers described requesting a variety of trainings, including a “refresher” on HighScope; differentiation strategies for children of different ages and abilities; and trainings with concrete, applicable teaching strategies.

Hearing Directly from Parents



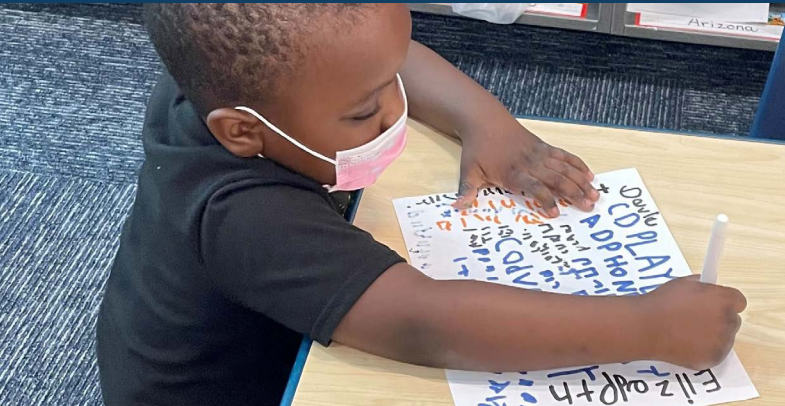
Well, they certainly provided a good option for childcare. You know, I know there's a lot of other families that had their kids there too that qualify for the...free tuition, and you know I don't think you could over...state how important that is for families; childcare is so expensive. That's a huge, huge benefit that I see the Tempe PRE offering.”

—PARENT (2022)



“Not too long ago, I was a single mom to my daughter and I was working...extremely long hours. And so knowing that if need be, I could drop them off at 7:20 and pick them up at 5 and know that they're safe and know I'm not just working just to pay my daycare bills... Also they are just super helpful and understanding in situations and even on breaks, when I'm still working, I can drop them off at the camp and know that they are safe and again not paying for the daycare. That wouldn't be [the case] if it wasn't for Tempe PRE.”

—PARENT (2024)



“When talking to other people, we do rave about [Tempe PRE]. The first reasons we were looking into it was the cost options that there are, and then the holiday schedule is the same as the school districts, which was a big deal when we had multiple kids.”

—PARENT (2024)

“I can sleep better at night knowing that the next day I can wake up and take my child to school and know that she's being treated with respect, with kindness, with love.”

—PARENT (2022)



What Impact did Tempe PRE have on Families and Students?

Tempe PRE offered parents new opportunities around housing, employment, and schooling

Tempe PRE offers eligible families a free preschool option for their children. In addition, over the summer and holiday breaks, eligible families can bring their child(ren) to be cared for. Through interviews with principals, teachers, and family members, we heard that Tempe PRE's cost and open hours were crucial for families, allowing them to seek out further education and employment opportunities, and reducing stress around the costs of child care.

Students' kindergarten outcomes suggest Tempe PRE may positively prepare students for kindergarten

As noted earlier, the number of Tempe PRE students who remained in the Tempe Elementary School District for kindergarten was lower than expected. Because of this, our final sample sizes were smaller than is typical for an evaluation of this type. Our

Hearing Directly from Teachers

One teacher summarized the benefits to families by saying

Parents are also getting their education, going to work, doing what they need to do to be a provider for their children as well. So, I feel like it's impacting huge, huge things. I've had parents that have graduated from school. I've had parents that got their GED. I've had parents that get excited because they've got their visas, you know, so hearing those stories. While those kids are here in our care



and learning environment, those parents are able to do that. So, I feel like it's huge. It's a huge success and a win for us for that reason.

—TEACHER (2022)

Hearing Directly from Principals

A principal in one of the schools also highlighted the benefits to families:



I know the parents... especially for the free parents, that's been really impactful for them to... help with our quality of life. We've had parents get jobs. We've had parents, you know, be able to get better housing. So, all of those things, I think have really improved the quality of life for those families. **-PRINCIPAL (2022)**



findings on Tempe PRE's impact on students' kindergarten readiness and end-of-year outcomes were not statistically significant.^{xi} Sample sizes were likely an issue in the lack of statistical significance. This means that the findings may not be generalizable to other groups of students who attend Tempe PRE (or other preschool programs). However, the findings presented below represent the true outcomes of all students in our study.

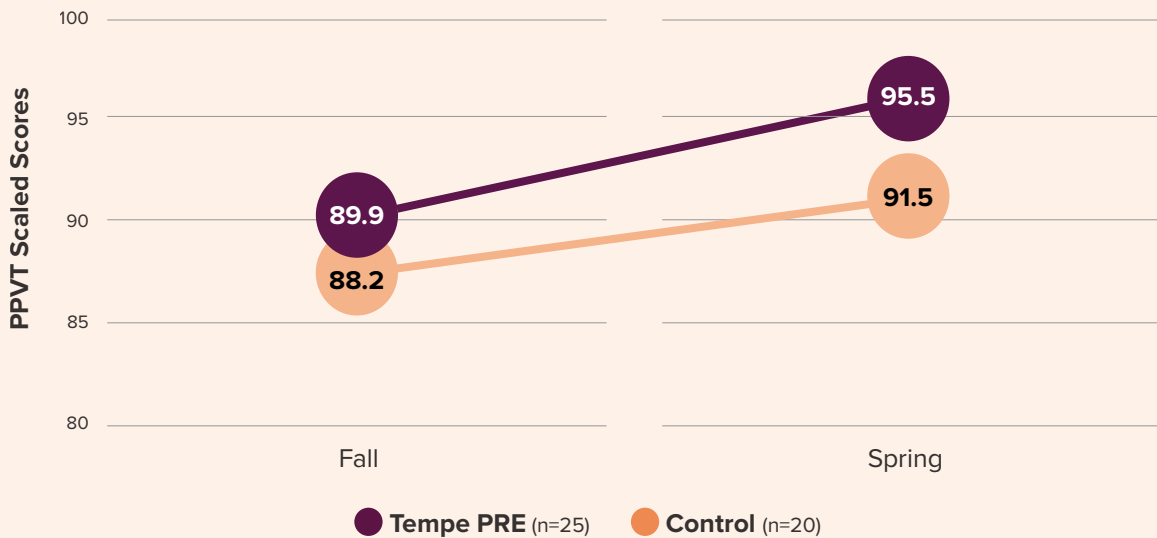
Tempe PRE students were better prepared for kindergarten than their peers.

Through interviews, principals, teachers, and parents shared their perceptions of how Tempe PRE impacted students' learning and readiness for kindergarten. Their perspectives are corroborated by a set of findings based on a direct assessment of receptive vocabulary and teacher ratings of social-emotional development when students entered kindergarten (post-Tempe PRE).

Tempe PRE students started kindergarten with higher receptive vocabulary scores and grew faster than their control group peers over the kindergarten year

While not statistically significant, Tempe PRE students started kindergarten with **slightly higher** receptive vocabulary as measured by the Peabody Picture Vocabulary Test (PPVT-5; average regression-adjusted score was 89.95 for treatment group students and 88.22 for control group students). In the spring, most students had higher PPVT-5 scores than in the fall, although differences at this time point were also not statistically significant across the two groups (average scores were 95.47 for the treatment group and 91.74 for the control group).

While also not statistically significant, the vocabulary scores for students enrolled in Tempe PRE **grew slightly more** than students who did not attend the program. The effect size for the difference in growth between the two groups was 0.24. This difference in growth means we would expect participation in Tempe PRE to increase students' vocabulary scores by 0.24 standard deviations more during the kindergarten year compared to students who did not attend the program.

Figure 6. Peabody Picture Vocabulary Test (PPVT) growth by group

Notes: Models control for English language learner (ELL) status, special education status, race, free/reduced price lunch eligibility, and the number of days between the fall and spring assessment. See **Appendix B: Impact Evaluation Methods** for more detail.

Another method for assessing students' vocabulary outcomes is to explore descriptive data on how many students met PPVT benchmarks for children their age. The PPVT manuals report how each child's score corresponds to performance compared to expectations (based on other children their age), from "well below expected" to "above expected." **Figure 7** shows the percentage of students meeting each benchmark in spring 2023 by study group. More Tempe PRE students ended kindergarten meeting receptive vocabulary expectations than their control group peers, with 8% of them "above expected."

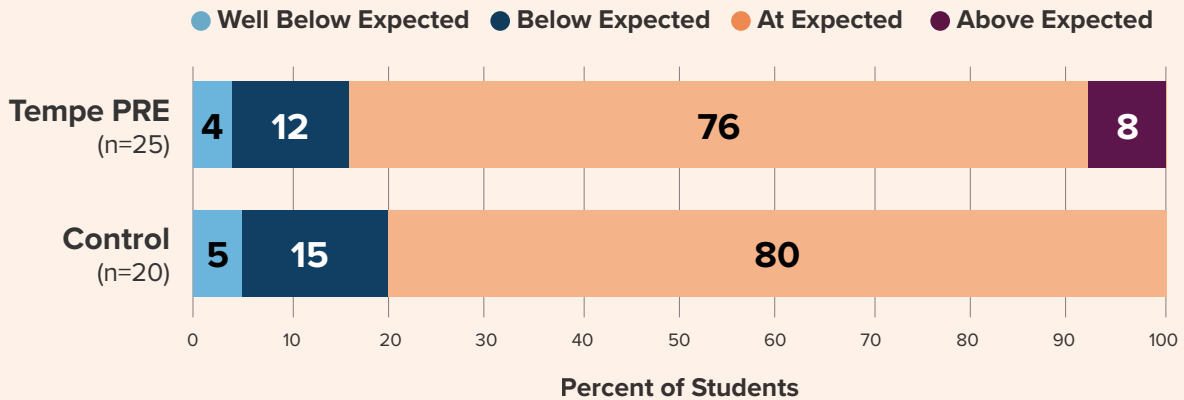
Hearing Directly from Parents



Seeing my daughter go from last year when she first started preschool after being in daycare, it's incredible how much she has grown and learned. Even looking at a book, a lot of times if she is reading a book at school and then she brings it home, she can tell the story and the general idea of the story.

—PARENT (2024)



Figure 7. Spring Peabody Picture Vocabulary Test (PPVT) benchmarks by group

Tempe PRE students started kindergarten with more positive social-emotional skills, and while other students started to “catch up,” Tempe PRE students maintained a slight advantage at the end of kindergarten

While not statistically significant, students in the intervention group (Tempe PRE) had **slightly higher** regression-adjusted ERC scores in the fall (-0.01) compared to control students who were not offered a spot in the program (-0.22).^{xii} See Table E-1 in Appendix E for more details on the scores. More positive ERC scores indicate a higher frequency of positive behaviors and lower frequency of negative ones, while more negative scores indicate a higher frequency of negative behaviors and lower frequency of negative ones.

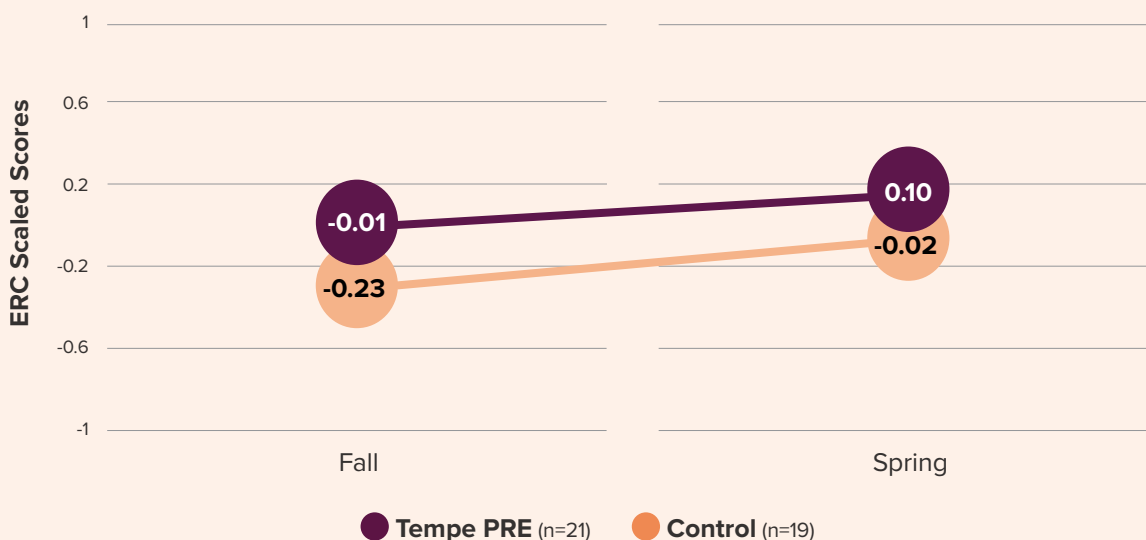
By the end of kindergarten, students in the control group increased their scores (to -0.02), but the intervention group slightly outperformed them (at 0.10). The effect size for the difference in growth between the two groups, while not statistically significant, was -0.1 meaning that the Tempe PRE group grew at a slightly lower rate than students in the control group.

Hearing Directly from Teachers



A lot of it, I feel is just that social-emotional aspect. I understand, you know, they’re going to hit all those academics there...But so much of it...is just being ready to collaborate, to just be around other students, or away from [their] parents, listening skills. Knowing how to go to the bathroom, how to wash their hands, how to...sit and eat in a community...and picking up after themselves, managing their emotions, identifying their emotions. All of that is going to make them able to absorb better, the lessons that they’re going to get, the more academic focus that they’re going to get in kindergarten. You know, knowing how to sit on the rug when it’s rug time. **—TEACHER (2022)**



Figure 8. ERC growth by group

Notes: Positive scores indicate a high frequency of positive behaviors and low frequency of negative ones, while negative scores indicate a high frequency of negative behaviors and low frequency of negative ones.

Although growth was slower for Tempe PRE students over the kindergarten year, Tempe PRE students exhibited higher ERC scores than control students at both time points—fall and spring of kindergarten (though not statistically significant). However, because children in the control group grew *slightly* more in their skills over the kindergarten year, the differences between the two groups of students were smaller by the end of kindergarten.

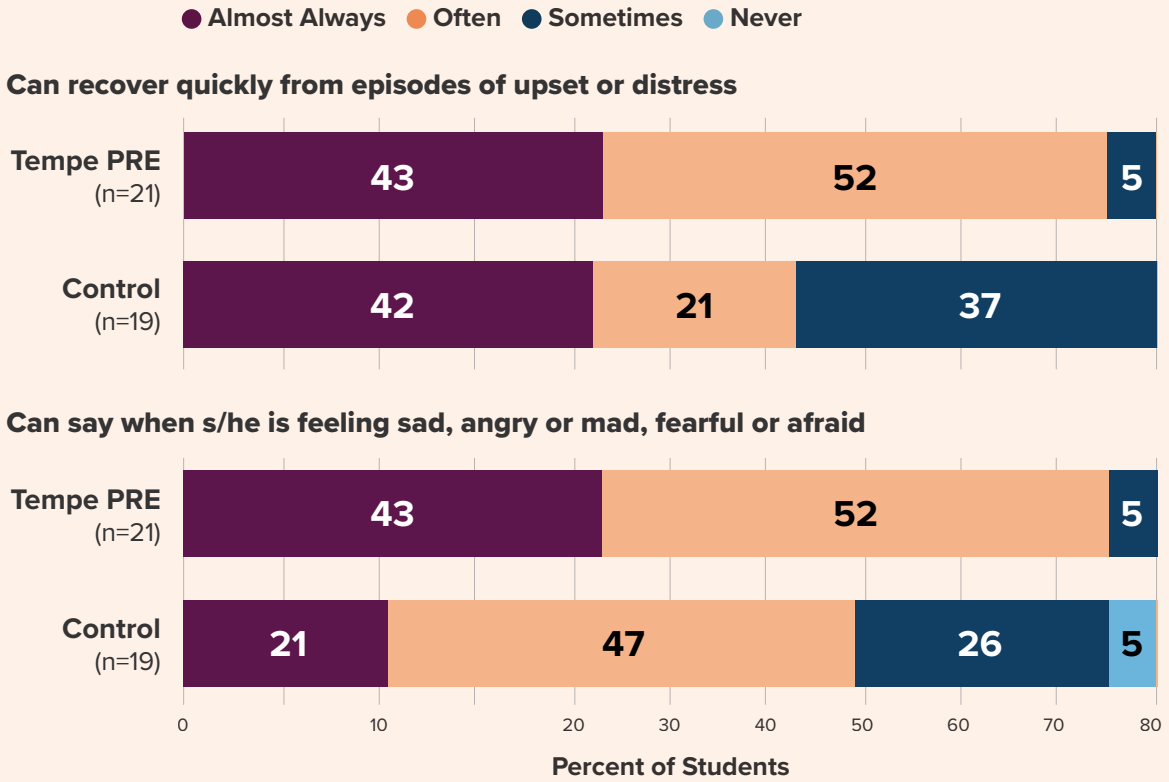
More Tempe PRE students began kindergarten able to regulate and verbalize their emotions than their control group peers.

To better understand what these composite scores mean in the context of students' behavior, we explored responses to individual survey items. Figure 8 shows how often students exhibited two key emotional regulation behaviors in the fall of their kindergarten year:

- 1) How often a student is able to recover quickly from episodes of upset or distress, and
- 2) How often a student can say when s/he is feeling sad, angry, or mad, fearful, or afraid

More Tempe PRE students began kindergarten with strong emotional regulation and a high ability to verbalize emotions. In other words, children in the treatment group were more likely to be rated in the “often” category and less *likely* to be rated in the “sometimes” or “never” category for both of these items.

Figure 9. Fall ERC item level differences by group



Key Takeaways



The goal of the Tempe PRE evaluation was to both understand its implementation and measure the effect of the Tempe PRE program on two foundational skills in kindergarten: early literacy and social-emotional skills. The findings in this report supplement previous learnings about the programs' early successes and challenges.^{xiii}

In general, principals, teachers, and parents recounted positive experiences with the Tempe PRE program during the 2021-22 school year. Staff described strong connections with each other and with families, and they praised their students' readiness for kindergarten. Parents agreed that their relationships with teachers were positive and that their children were well prepared for kindergarten.

Teachers implemented the majority of the HighScope curriculum with fidelity. This included incorporating child-directed learning, implementing positive behavior management, and executing conflict resolution approaches that involved child input. Tempe PRE teachers described receiving strong training and supports, although the COVID-19 pandemic disrupted some of the consistent training and coaching that teachers had come to expect.

Prior to collecting outcome data and based on our observation activities, we expected students who attended Tempe PRE to have higher scores on both early literacy and social-emotional measures at kindergarten entry due to the immediate effects of the program. Indeed, while not reaching statistical significance, results suggest that students who attended Tempe PRE scored higher on teacher reports of **social-emotional skills** in the fall of kindergarten and had higher **receptive vocabulary** scores than their non-Tempe PRE peers (control group). However, on social-emotional skills, the control group grew more over the kindergarten year than former Tempe PRE students, reducing the gap between the two groups by the end of kindergarten. When measuring growth over the kindergarten year, students who attended Tempe PRE showed greater receptive vocabulary growth compared to the control group.

Our evaluation documented the successful early installation of a high-quality preschool program that was designed to provide novel access to children from low-income households who would not otherwise have had such an opportunity in their community. Through close collaboration among multiple local government and philanthropic partners, and with a strong, common commitment to quality, the Tempe PRE program was structured and implemented with key components hypothesized to produce positive child outcomes.^{xiv} These components included staffing certified teachers, providing ongoing teacher coaching and training, offering school district-level teacher pay and benefits packages, using an evidence-informed curriculum, implementing formative child assessment, giving a full-day program dosage, and including an opportunity for before and after school care to maximize families' feasibility for children to attend. These quality features required significant investments from the City of Tempe, Tempe EI, and philanthropy. With support from Helios Education Foundation, NORC's

independent evaluation provided both formative and summative insights that highlighted implementation strengths and challenges and documented the impact of the program on students' outcomes. The Tempe PRE partners actively embraced these findings, using them to improve the program, increase implementation fidelity, expand enrollment, and ultimately secure permanent city funding for the program into the future. In a post-COVID world where equitable access to high quality ECE is needed but challenging, Tempe PRE serves as one potential model for local stakeholders to create opportunity for their young children and families most in need.

Appendices



Appendix A: Implementation Evaluation Methods

The implementation evaluation sought to understand classroom practices in Tempe PRE classrooms; the experiences of teachers, families, and principals; broader program implementation; and changes over time. NORC researchers used interview and observational data to understand Tempe PRE implementation in spring 2022.

Sample and selection of schools and classrooms

We sampled six of the seven schools in which Tempe PRE operates, excluding only Getz Elementary School. Getz was excluded because the school only serves children with disabilities, and as such the program is not readily compared to the other schools. Furthermore, Getz does not have a kindergarten that children transition into.

Across the six schools visited, NORC researchers observed six out of nine possible classrooms. Two excluded classrooms were taught by long-term substitute teachers and one excluded classroom was taught by a teacher who began in the middle of the year. NORC interviewed all six teachers whose classrooms were observed, as well as the teacher who began mid-year.

Primary data collection

Site visits, including classroom observations, teacher interviews, and principal interviews were conducted between March 28 – April 1, 2022. Parent interviews took place over the phone in April and May 2022.

Classroom observations. We observed each classroom for a three-hour period during the morning. We developed a classroom observation protocol by adapting several existing protocols and supplementing them with additional questions relevant for this evaluation. The protocol from NORC's 2019 observation of Tempe PRE classrooms was updated for 2022 to reflect learnings from 2019 (see Appendix D).^{xv} To observe fidelity to the HighScope curriculum, we adapted items from the Preschool Program Quality Assessment (PQA; the official fidelity tool used by HighScope) and from HighScope's Quick Guide to HighScope Implementation and Revised Fidelity Tool draft obtained directly from HighScope staff (in March 2019). These items focused on the learning environment (including classroom setup); how the teacher implemented key activities during the day (e.g., Meal Time, Planning Time, Large Group Time); and levels of child choice, active learning, and conflict resolution. Additional items focused on classroom management, content-based instruction, cognitive demand, and student engagement. These were developed based on items from the Advanced Narrative Record Manual (Farran et al., 2015) and an adapted version of the COMET (Classroom Observation of Early Mathematics Environment and Teaching; Sarama & Clements, 2009).

Staff interviews. At each selected school, we interviewed the principal and preschool teachers of the observed classroom(s). Whenever possible, two NORC staff members were present so that one could conduct the interview and the other could take notes. With consent, NORC recorded interviews. Principal and preschool teacher interviews focused on understanding preschool program implementation (including facilitators and barriers), teacher professional development and coaching, the HighScope curriculum, impressions of the program (successes and challenges), family/community engagement, alignment between preschool and kindergarten, role of before/after care, and results and lessons learned.

Parent interviews. We assigned all Tempe PRE families a random number and reached out to parents in numerical order over phone and email. Tempe PRE staff sent notifications to parents beforehand to encourage participation. Parents were offered to schedule an interview at a time that is convenient to them and were asked whether they prefer to conduct the interview in English or Spanish. Three parents out of fourteen opted to conduct the interview in Spanish. Interview topics included parents' experiences with and impressions of the Tempe PRE program and beliefs about kindergarten readiness.

Implementation evaluation analyses

Our approach to gaining a greater understanding of the context, people, and organizational interactions that are embedded in each school and classroom is rooted in grounded theory. Following site visits, notes from the interviews and focus groups were cleaned and checked for completeness. Qualitative data derived from respondents at each school were organized into pre-determined categories corresponding to interview topics (e.g., instructional practices, perceptions of student outcomes, professional development, and coaching supports). This resulted in six school-level summary documents that represented the multiple points of view of teachers, parents, and the principal. The responses within each category (e.g., coaching supports) were analyzed comparatively to identify relevant themes across respondents and schools. Similarities and differences across schools and classrooms were identified and noted. This strategy facilitated the identification of new topics and issues and enhanced NORC's understanding of the Tempe PRE program and its implementation.

Observation data were recoded into numerical scores in order to calculate levels of fidelity or implementation of particular practices. For example, a question that had three response categories capturing incremental levels of fidelity was recoded as 0 percent, 50 percent, and 100 percent. As a concrete example, one item under Conflict Resolution was a rating of how much "Teachers involve children in identifying the problem," and the options were either No/minimally, Sometimes or with some children, or Yes. Because Conflict Resolution was coded for each activity period that was observed, the recoded numerical values were then averaged across all activities observed. A similar approach was used for all marked responses using our classroom observation protocol. Descriptive analyses were also conducted on the additional data NORC received from Tempe PRE partners. These data were then used in combination with the qualitative analysis described above to yield a comprehensive review of Tempe PRE implementation in its second year.

Study methodological limitations

Our study methods and available data have several limitations. Around our implementation evaluation, we note that our observations were conducted during a single half-day visit. This means that what we saw on the day of our visit may not be completely representative of what occurs in that classroom. We also only observed 6 of the 11 Tempe PRE classrooms in TESD. Lastly, there is a degree of selection bias in our parent interview sample. Although all parents were contacted in random order, parents who chose to answer the phone or respond to our emails may be different from parents who chose not to answer our outreach in ways relevant to our study. Furthermore, we were only able to connect with parents from 5 out of 6 schools.

Appendix B: Impact Evaluation Methods

Sample

To be eligible for the impact study, students needed to meet the following three criteria:

- 1) Applied to Tempe PRE for the 2021-2022 school year via the admissions lottery
- 2) Were eligible to attend Tempe PRE for free^{xvi}
- 3) Attended kindergarten in Tempe EI in 2022-2023

From this sample, we compare two groups of students: those who were offered a spot in Tempe PRE and attended the program (our **intervention** group) compared to students who were eligible but were not offered a lottery spot (our **control** group). This study included students from these two groups whose parents provided signed consent for data collection.

Table B-1 provides detailed counts of the lottery and analytic sample. Of the 261 students who applied for the lottery, 155 were offered a spot in the program. Of those 155, 99 students enrolled in Tempe PRE (64%). While we anticipated that up to 66 intervention students and up to 88 control students might enroll in Tempe EI kindergarten, only 43 intervention students (65%) and 40 control students (45%) did. This notable drop off may be of interest to Tempe EI and limits the extent to which our analysis can observe any differences between intervention and control students. After we obtained parent consent, 28 intervention students and 21 control students were enrolled in the study.

Table B-1. Lottery sample

	Offered a spot	Not offered a spot
Application Decision 2021	155	106
Attended Tempe PRE 2021-22	99	-
Age-eligible For Kindergarten ^{xvii}	60-66	61-88
Enrolled in Tempe EI Kindergarten Fall 2022	43	40
Enrolled in Tempe EI Kindergarten Spring 2023	42	39
Provided Parent Consent	28	21
Completed Fall 2022 Peabody Picture Vocabulary Test (PPVT)	26	21
Completed Spring 2023 Peabody Picture Vocabulary Test (PPVT)	25	20
Had Completed Fall 2022 Emotion Regulation Checklist Data (ERC)	21	19
Had Completed Spring 2023 Emotion Regulation Checklist Data (ERC)	20	19

Table B-2 compares the demographic characteristics of the intervention and control groups in our full analytic sample.

Table B-2. Group demographic characteristics of the analytic sample

Indicator		Tempe PRE Group (N=28)		Control Group (N=21)	
		N	Percent	N	Percent
Student Demographics					
English Language Learner		6	21%	-	-
Special Education		3	11%	3	14%
Race	White	4	14%	4	19%
	Black	5	18%	4	19%
	Hispanic	17	61%	10	47%
	American-Indian/ Alaskan Native	-	-	-	-
	Asian	-	-	-	-
	Mixed	-	-	-	-
Gender	Female	15	54%	9	43%
	Male	13	46%	12	57%
Free or Reduced-priced Lunch	Free	13	46%	10	47%
	Reduced	6	21%	-	-
	Paid	9	32%	9	43%

Note: Cells marked with “-” indicate an N less than or equal to two. Exact numbers are omitted for privacy.

Any differences between these two groups should be random due to the random assignment into the treatment group via the lottery. However, there were a few key differences worth noting. First, students in the treatment group are:

- 1) more likely to be classified as English Language Learners,
- 2) more likely to be female, and
- 3) less likely to pay full price for school lunch than students in the control group.

Even though the RCT design provides theoretical balance between the two groups, final analyses controlled for the effects of these demographic variables when testing for the impact of Tempe PRE.

Measures

This evaluation involved the collection of two kindergarten outcome measures: the Peabody Picture Vocabulary Test (Version 5)^{xviii} and the Emotion Regulation Checklist.^{xix} We chose to focus on students' early literacy and social-emotional skills. These assessments are each highly validated and closely aligned with outcomes that Tempe PRE targets: oral language development and social-emotional learning.

The Peabody Picture Vocabulary Test (PPVT-5) is a standardized assessment of students' receptive vocabulary commonly used in research and school settings. Children are presented with four images and asked to point to the picture that represents the word they hear. Children are administered the assessment until they answer six consecutive questions incorrectly. PPVT scores are standardized, which adjusts the raw number correct to account for the child's age. A score of 100 means that the child performed at the 50th percentile (better than 50% of children) for their age.

The Emotion Regulation Checklist (ERC) is a teacher-reported measure of students' social-emotional development. The survey consists of 24 items that address a range of social and emotional skills, such as internal/personal emotional regulation, interactions with peers, and interactions with teachers (See **Appendix C** for the full scale). Some items are framed positively while others are framed negatively. For each child, teachers were asked to rate how frequently each behavior occurred on a 4-point Likert scale ranging from "Never" to "Almost Always." Items that reference negative behaviors were reverse coded and a composite score was calculated based on how all items related to each other using factor analysis. Students' ERC scores ranged from -3 to 2.5; positive scores indicate a high frequency of positive behaviors and low frequency of negative ones, while negative scores indicate a high frequency of negative behaviors and low frequency of negative ones. For example, a positive score suggests a student was rated as frequently exhibiting behaviors such as "transitioning well from one activity to another" but rarely "displaying negative emotions when attempting to engage others in play."

Data collection

Under the supervision of NORC staff, the PPVTs were conducted by undergraduate and graduate students at Arizona State University (ASU). NORC researchers trained these data collectors prior to the start of data collection in fall 2022 and conducted a refresher

training with them in spring 2023. Data collection occurred from September 19th through November 17th 2022 in the fall, and March 27th through April 13th 2023 in the spring. NORC staff worked with Tempe EI district staff to plan for and schedule data collection efforts. Data collectors worked directly with schools on an individualized, adaptive basis to ensure that assessments were minimally disruptive to classrooms and instruction.

The ERC was completed for each child by the child's kindergarten teacher via a Qualtrics web survey. Data collection occurred from October 24th through December 15th 2022 in the fall and April 12th through May 10th 2023 in the spring. Teachers were prompted to complete the online survey by Tempe EI district staff and received a \$20 Amazon gift card per survey completed.

Data analysis

We used regression models to examine the effect of Tempe PRE on students' PPVT and ERC scores, adding control variables one at a time in a stepwise fashion. In particular, we consider the role of English language learner (ELL) status, special education status, race, free/reduced price lunch eligibility, and the number of days between the fall and spring assessment. **Appendix D** shows full model outputs.

Model 1 predicted students' scores using a treatment indicator (coded 1 for students in the intervention group and 0 for students in the control group). In Model 2, we added a variable indicating the testing timepoint (coded 1 for spring and 0 for fall). Model 3 added the number of days between the students' fall and spring assessments to account for potentially higher growth with more time between assessments. In Model 4, we added a variable indicating ELL status (coded 1 for ELL). In Model 5, we added a variable indicating special education status (coded 1 for Special education). In Model 6, we added a variable indicating the students' ethnicity (coded 1 for Hispanic and 0 for any other race/ethnicity). In model 7, we added a variable indicating free or reduced-price lunch status (coded 1 for free or reduced-price lunch).

Appendix C: Post-study Parent and Teacher Reflection Meetings

In February 2024, NORC researchers held meetings with then-current Tempe PRE parents and (separately) with Tempe PRE teachers. The goal was to share some main findings and seek reflections on them, hearing directly from those involved in the program most intimately.

Parent meeting

For this meeting, Tempe PRE office staff invited families to attend a meeting in the evening. They were told that NORC would share findings from the Tempe PRE study and that they "plan[ned] to use some of these stories to provide a key perspective on how Tempe PRE fits into your lives. Hearing the voices of families is a very important part of telling the story of Tempe PRE!" They were also provided with child care and a grocery store gift card for their time. Four parents attended this meeting.

During the meeting, NORC presented a few key findings from the study and then asked parents to reflect on the following questions:

- Which pieces of these data speak to your child’s experiences with Tempe PRE? In what ways?
- When you talk to other people about your child attending Tempe PRE, what do you share?
- How has Tempe PRE made a difference for **you personally** and/or **your family**?
- Are there things you would suggest to make Tempe PRE better?

Teacher meeting

All Tempe PRE teachers were invited to come together during a Friday afternoon when they had collaborative time already set aside. Eight teachers attended the meeting. Similar to the parent meeting, NORC presented a few key findings from the study. Teachers were then asked to provide reflections, on sticky notes, about the following:

- What about these findings resonate?
- What feels inconsistent with your experiences?
- What keeps you teaching in Tempe PRE?
- What would help make Tempe PRE better, for you or your students?

Appendix D. Emotion Regulation Checklist (ERC)

Response options: **Almost Always, Often, Sometimes, Never**

1. Is a cheerful child
2. Exhibits wide mood swings
3. Responds positively to neutral or friendly approaches by adults
4. Transitions well from one activity to another
5. Can recover quickly from episodes of upset or distress
6. Is easily frustrated
7. Responds positively to neutral or friendly approaches by peers
8. Is prone to angry outbursts/tantrums easily
9. Is able to delay gratification
10. Takes pleasure in the distress of others
11. Can modulate excitement in emotionally arousing situations
12. Is whiny or clingy with adults
13. Is prone to disruptive outbursts of energy and exuberance
14. Responds angrily to limit-setting by adults

15. Can say when s/he is feeling sad, angry or mad, fearful or afraid
16. Seems sad or listless
17. Is overly exuberant when attempting to engage other in play
18. Displays flat affect
19. Responds negatively to neutral or friendly approaches by peers
20. Is impulsive
21. Is empathetic towards others; shows concern when others are upset or distressed
22. Displays exuberance that others find intrusive or disruptive
23. Displays appropriate negative emotions in response to hostile, aggressive, or intrusive acts by peers
24. Displays negative emotions when attempting to engage others in play

Source: Shields, A., & Cicchetti, D. (1997). Emotion regulation among school-age children: the development and validation of a new criterion Q-sort scale. *Developmental Psychology*, 33(6), 906. <https://doi.org/10.1037/0012-1649.33.6.906>

Appendix E. Impact Estimation Regression Tables

Table E-1. Fall and spring score estimates by group

Outcome Measure	Group	Fall Score Mean (SD)	Spring Score Mean (SD)	Growth Effect Size
Vocabulary (PPVT)	Tempe PRE	88.95 (2.18)	95.47 (2.18)	0.24
	Control	88.95 (2.18)	91.74 (2.41)	
Social-Emotional Skills (ERC)	Tempe PRE	-0.01 (0.25)	0.10 (0.25)	-0.10
	Control	-0.22 (0.25)	-0.02 (0.25)	

Notes: (1) Standard Errors shown in parentheses below group estimates (2) Growth effect sizes are calculated as the difference in growth between the Tempe PRE group and the control group.

Table E-2. PPVT outcomes

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Attended Tempe PRE	0.138 (3.057)	-0.714 (3.274)	-1.113 (3.461)	0.929 (3.302)	0.838 (3.311)	0.946 (3.338)	1.726 (3.357)
Spring Assessment		3.724** (1.858)	3.526* (1.873)	3.526* (1.873)	3.526* (1.873)	3.526* (1.873)	3.526* (1.873)
Attended Tempe PRE* Spring Assessment		1.769 (2.507)	1.995 (2.531)	1.995 (2.531)	1.995 (2.531)	1.995 (2.531)	1.995 (2.531)
Days between Spring and Fall Assessment			0.0987 (0.122)	0.120 (0.112)	0.109 (0.118)	0.107 (0.118)	0.0579 (0.124)
English Language Learner Status				x	x	x	x
Special Education Status					x	x	x
Hispanic						-0.770 (3.133)	-0.712 (3.082)
Free/Reduced-Price Lunch Status							-4.143 (3.498)
Constant	91.90*** (2.284)	90.12*** (2.443)	73.41*** (20.55)	70.41*** (18.92)	72.62*** (20.14)	73.15*** (20.25)	83.97*** (21.91)
Observations	92	92	84	84	84	84	84
Number of Students	50	50	42	42	42	42	42

***p<0.01, **p<0.05, *p<0.1; Standard errors in parentheses

Note: cells marked with “x” indicates at least one of the groups has fewer than 5 students. Exact numbers are omitted for privacy.

Table E-3. Emotion regulation checklist outcome models

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Attended Tempe PRE	0.267 (0.295)	0.332 (0.335)	0.322 (0.357)	0.321 (0.361)	0.193 (0.367)	0.177 (0.368)	0.222 (0.365)
Spring Survey		0.199 (0.228)	0.211 (0.230)	0.211 (0.230)	0.211 (0.230)	0.211 (0.230)	0.211 (0.230)
Attended Tempe PRE* Spring Survey		-0.128 (0.320)	-0.099 (0.326)	-0.099 (0.326)	-0.099 (0.326)	-0.099 (0.326)	-0.099 (0.326)
Days between Spring and Fall Survey			0.001 (0.010)	0.001 (0.010)	-0.006 (0.011)	-0.005 (0.012)	-0.007 (0.012)
English Language Learner Status				x	x	x	x
Special Education Status					x	x	x
Hispanic						0.144 (0.333)	0.151 (0.327)
Free/Reduced-Price Lunch Status							-0.392 (0.330)
Constant	-0.194 (0.214)	-0.294 (0.243)	-0.453 (1.725)	-0.452 (1.726)	0.860 (1.952)	0.554 (2.071)	1.193 (2.102)
Observations	79	79	72	72	72	72	72
Number of Students	43	43	36	36	36	36	36

***p<0.01, **p<0.05, *p<0.1; Standard errors in parentheses

Note: cells marked with “x” indicates at least one of the groups has fewer than 5 students. Exact numbers are omitted for privacy.

Endnotes

- ⁱ Caroly, L. A. & Cannon, J. S. (2021). *Making preschool investments count through the American Families Plan*. <https://www.rand.org/pubs/commentary/2021/06/making-preschool-investments-count-through-the-american.html>
- ⁱⁱ Friedman-Krauss, A. H., Barnett, W. S., Hodges, K. S., Garver, K. A., Jost, T. M., Weisenfeld, G., Duer J. (2024). *The State of Preschool 2023: State Preschool Yearbook*. New Brunswick, NJ: National Institute for Early Education Research. <https://nieer.org/yearbook/2023>
- ⁱⁱⁱ City of Tempe (2024). Poverty rate: *Quality of life*. <https://data.tempe.gov/pages/97b67ec3b174493abba967196f1793d5>
- ^{iv} U.S. Census Bureau (2022). *Poverty in the United States: 2021. Current Population Reports*. <https://www.census.gov/library/publications/2022/demo/p60-277.html>
- ^v DiDomenico, A. L. (2017). *Expanding high-quality preschool in Tempe: Highlights of a Pay for Success feasibility study*. <https://www.instituteforchildsuccess.org/wp-content/uploads/2017/12/Tempe-Feasibility-Study-Highlights-5-8-17.pdf>
- ^{vi} During the first two years of implementation, Kyrene School District also housed two Tempe PRE classrooms, hiring teachers and instructional assistants and providing school-level supports. There are no longer Tempe PRE classrooms in the Kyrene School District.
- ^{vii} The 7 teachers interviewed were from the same schools as the principals. One teacher was interviewed, but not observed, because the teacher started teaching Tempe PRE mid-year.
- ^{viii} Pianta, R. C., LaParo, K. M., & Hamre, B. K. (2008). *Classroom Assessment Scoring System (CLASS) manual, Pre-K*. Baltimore, MD: Pal H. Brookes Publishing Co., Inc.
- ^{ix} Werner, K. & Woessmann, L. (2021). *Will the Covid-19 pandemic leave a lasting legacy in children's skill development?* CESifo Forum, ISSN 2190-717X, ifo Institut - Leibniz-Institut für Wirtschaftsforschung an der Universität München, München, Vol. 22, Iss. 06, pp. 33-40. <https://www.econstor.eu/bitstream/10419/250949/1/CESifo-Forum-2021-06-p33-40.pdf>
- Egan, S.M., Pope, J., Moloney, M. et al. (2021). Missing early education and care during the pandemic: The socio-emotional impact of the COVID-19 crisis on young children. *Early Childhood Education Journal*, 49, 925–934. <https://doi.org/10.1007/s10643-021-01193-2>
- ^x See, for example: Fan, X., & Chen, M. (2001). Parental involvement and students' academic achievement: A meta-analysis. *Educational Psychology Review*, 13, 1–22. <https://doi.org/10.1023/A:1009048817385>
- Park, S., & Holloway, S. D. (2017). The effects of school-based parental involvement on academic achievement at the child and elementary school level: A longitudinal study. *The Journal of Educational Research*, 110, 1-16. <https://doi.org/10.1080/00220671.2015.1016600>
- Vartuli, S., & Winter, M. (1989). *Parents as First Teachers*. In Second Handbook on Parent Education. M. Fine, ed. New York: Academic Press, 1989, 99–117. <https://doi.org/10.1016/B978-0-08-091820-4.50010-6>

- ^{xi} In order to detect statistically significant differences, sample sizes need to be large enough to be confident in the averages, or to reduce the error in our estimates. As noted in the *Methods section*, we expected more students to be eligible for the study by staying in the Tempe Elementary School District for kindergarten. The smaller-than-expected sample sizes substantially reduced our analytic sample and our power to detect statistically significant effects of the program.
- ^{xii} ERC scores were calculated using principal components analysis, with directionality determined by polychoric correlations.
- ^{xiii} Ehrlich, S. B., Gordon, M. F., Kabourek, S. E., Francis, J., Hernandez, M. W., Norwood, J., Perrault, P., & Conroy, M. (2021). *City of Tempe Preschool Resource and Expansion*. Retrieved from <https://www.helios.org/media/amcl1q4m/brief-city-of-tempe-preschool-resource-and-expansion.pdf>
- ^{xiv} Weiland, C., McCormick, M., Mattera, S., Maier, M., & Morris, P. (2018). Preschool curricula and professional development features for getting to high-quality implementation at scale: A comparative review across five trials. *AERA Open*, 4(1). <https://doi.org/10.1177/2332858418757735>
- ^{xv} “Learnings” refer to logistical challenges the observers had in implementing the observation protocol and decisions about which portions of the protocol provided too much detail to make meaning from. This allowed for a simplified version of the observation protocol, while maintaining most of it to be aligned across our 2019 and 2022 observations.
- ^{xvi} In order to be eligible for Tempe PRE, children must reside in Tempe, Arizona, be at least 3 years old by the program start, and be fully potty trained. To be eligible for free tuition, families must earn no more than 200% of the federal poverty line. Note that it is possible that some families who were not selected through the lottery may not have been income eligible for Tempe PRE through with free tuition; not all incomes were verified if not selected for the program.
- ^{xvii} 33 children applied to Tempe PRE with incomplete birthday information. As such, ranges of potential Ns are given.
- ^{xviii} Dunn, D. M. (2019). *Peabody Picture Vocabulary Test* (5th ed.). NCS Pearson.
- ^{xix} Shields, A., & Cicchetti, D. (1997). Emotion regulation among school-age children: The development and validation of a new criterion Q-sort scale. *Developmental Psychology*, 33, 906–916.
- ^{xx} We intended to also include students’ attendance as a control, but there was little variation in this variable. We therefore decided to exclude it to make the models easier to interpret.