Effective Learning Experiences in Preschool and School Readiness: Evidence from the Midwest Child-Parent Center Expansion[i]

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Summary

Quality in early childhood programs has been a longstanding priority in policy and practice. Identifying the contribution of specific elements of high quality or effective learning experiences (ELE) is critical in scaling effective programs to population levels. This Brief summarizes preschool findings for five ELEs in the Midwest Child-Parent Center (CPC) Expansion Project: (1) full-day preschool, (2) small classes (17 or fewer children), (3) balance of teacher-directed and child-initiated instruction, (4) a high percentage of instructional time in core domains, and (5) an engaging classroom environment. Midwest CPC is a scale-up of the CPC program established in Chicago. The program has demonstrated sustained effects on well-being from school readiness to adult educational and socioeconomic success. Based on 2012-2013 implementation and school data for over 2,000 preschool students in Chicago and Saint Paul Public School Districts, 80% of children experienced 3 or more ELE elements. This was exclusive of B.A. certified/licensed teachers (which all children had). Given that full-day preschool was limited to 25% of Chicago children and was not available in Saint Paul, the prevalence of ELE is high. Evidence was strong in Chicago that preschool learning gains increased as the number of ELEs increased. In analyses that included fall baseline performance, family and child characteristics, full-day preschool and small classes were the largest and most consistent predictors of gains during the year in literacy, math, and socio-emotional learning. Findings indicate that structural program elements are important contributors to learning gains and positively influence the instructional context necessary for effective preschool experiences.

Background

Young children in the U.S. are enrolled in early education and care at the highest rates ever. In 2016, nearly 4 in 5 three- and four-year-olds participated in center-based education for at least part of the day.[1] This is an increase of nearly 50% since the mid-1980s when 55% of young children attended education and care programs. Although increased maternal employment and public investment in preschool led this shift, another key influence is the documented evidence over 5 decades that participation in good-quality programs and centers promotes healthy development and improves school readiness skills.[2,3] These gains have been found for all levels of socioeconomic status but tend to be greater for children at elevated levels of risk.[2, 4]

Whether improvements in learning are sustained or lead to long-term effects throughout childhood and into adulthood depends to a large extent on the quality of the program. For example, the landmark prospective cohort studies of the Cornell Consortium, Perry Preschool, Abecedarian Project, and Child-Parent Centers all showed large preschool gains that were sustained to adulthood.[5,6] For three of the program evaluations, economic returns exceeded costs by at least a factor of 3.[7,8] The key common components of the programs were (a) small classes and child:staff ratios no higher than 17:2, (b) an intensive focus on language and literary within a whole-child, developmental philosophy, (c) comprehensive family services, (d) BA-level teachers and/or staff compensation that was competitive with public schools, and (e) frequent monitoring and feedback for improvement.

Most current prekindergarten programs financed by states and school districts have few of the key elements of the landmark studies. Child:staff ratios are usually 20:2.[9] Family services and expectations for parent involvement are minimal. Curriculum and instruction often lack a strong evidence base, and provide few classroom supports for engaged learning. Program monitoring is cursory, and is designed for accountability rather than improvement. Costs per child are also lower. As one illustration, the Tennessee Voluntary Prekindergarten program may be classified as a routine state pre-K program based on these criteria and others.[4, 10] Child:staff ratios are 20:2, and

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although full-day services are provided, none of the comprehensive family services found in the landmark studies are evident. A recent experimental study of the program found positive effects at the end of preschool but no detectable effects on learning from kindergarten to 3rd grade.[11] Is this really surprising, given the accumulated evidence that only high-quality programs that follow the established principles of effectiveness from the field yield long-term effects?[12]

The purpose of this Brief is to describe the typology of effective learning experiences in the Child-Parent Centers (CPCs), one of the landmark projects that is currently undergoing scale-up as part of the Midwest CPC Preschool to 3rd Grade Program. Defining, implementing, and sustaining the key elements of program effectiveness is a major goal of all programs. Recent studies have shown that the CPC program significantly improves students' school readiness skills.[13,14,15] In this Brief, we examine one of the core program elements that is expected to underlie these program effects – effective learning experiences – and its relation to outcomes at the end of the preschool year.

Goals of the Brief

1) Define one of the six CPC program elements, effective learning experiences, in terms of measurable classroom characteristics.
2) Describe CPC classroom environments in terms of these classroom quality indicators.
3) Examine whether these indicators predict children's school readiness at the end of preschool, and whether they might help account for the observed CPC program effect.

Data from the Midwest Child-Parent Center Expansion Project

Data used in this brief come from the Midwest CPC Expansion, a scale-up of the CPC P-3 program implemented in Chicago, Evanston, and Normal (IL) as well as Saint Paul (MN) from 2012 to 2017. With funding from the U. S. Department of Education and many philanthropic partners, over 12,000 children from preschool to 3rd grade were served. We focus here on data from the Chicago and Saint Paul Public Schools, which served the most students in the project. CPC students in both districts were at elevated risk of school underachievement due to residing in high-poverty neighborhoods or low-income families. The racial and ethnic composition of each district was distinct. In Chicago, 64% of CPC participants were black and 34% Hispanic. In Saint Paul, 35% were black, 11% Hispanic, and 45% Asian. Notably, more than half of the Saint Paul CPC participants were Dual Language Learners, as compared to about 27% of CPC participants in Chicago.

Effective Learning Experiences (ELEs)

A key component of the CPC program is a supportive, engaging classroom environment that provides diverse, developmentally appropriate learning experiences. On the following page, we define five indicators that describe whether a preschool classroom is implementing ELEs according to the CPC model. Note that these indicators represent just one of the six CPC program elements, and do not provide a complete picture of program quality.[ii,iii] In this brief, we draw on data from the Midwest Child-Parent Center Expansion Project to examine how ELEs were implemented in a sample of CPC preschool classrooms, and whether their implementation predicted student success. The specific data used to define each indicator are outlined on the following page.

[ii] Teacher education and compensation are also emphasized in the CPC framework as elements of Effective Learning, with the recommendation that teachers hold at least a Bachelor's degree and receive compensation comparable to K-12 teachers. However, we were unable to analyze these as ELE indicators due to a lack of variation – nearly all of the data reported in this brief are based on teachers with at least Bachelor's degrees and compensation comparable to K-12 teachers (Appendix B), which made it impossible to compare classes that did vs. did not meet these recommendations.

[iii] For a summary of the full CPC framework, as well as parallel frameworks proposed by the Gates Foundation[24] and the National Institute for Early Education Research (NIEER),[9] see Appendix A.

Program Structure
1) Full day program: Program provides full-day preschool (6+ hours/day)
2) Low class size: Program classes have no more than 17 students[iv]
CPC recommendation met if… program length and class size match guidelines.

Classroom Environment	
Assessment: Classrooms are observed using the Classroom Learning and Activities Checklist (CLAC) tool, which assesses student task orientation and the instructional practices that support it. The CLAC has been found to reliably distinguish CPC and non-CPC preschool classrooms, suggesting that CPC classrooms are more likely to provide a task-oriented environment (see Appendix B).	
3) Task-oriented classroom: Instruction is sensitive to student needs, and structured in a way that supports child engagement, focus on learning activities, and active participation.	**CPC recommendation met if…** Classroom is rated above the school district mean on one or both of the CLAC factors: Instructional Responsiveness and Student Engagement.

Instructional Time	
Assessment: Teachers periodically complete the Classroom Activity Report (CAR), which asks them to indicate how class time is divided across instructional domains and what percentage of time in Language, Math, and Science is spent in child-initiated activities.	
4) Time in key domains: Program provides diverse learning experiences, including ample time in literacy, math, and science.	**CPC recommendation met if…** More than 65% of class time is spent in language/literacy, math, and science.
5) Balance of child- and teacher-driven instruction: Program provides a mix of activities allowing for independent child exploration and activities directed by the teacher.	**CPC recommendation met if…** Between 35 and 65% of time spent in language/math/science is dedicated to child-initiated activities.

How are CPC classrooms doing?

Below, we describe the pre-K classroom environments experienced by CPC students in the Chicago and Saint Paul school districts during the 2012-2013 school year, in terms of the five ELE indicators.

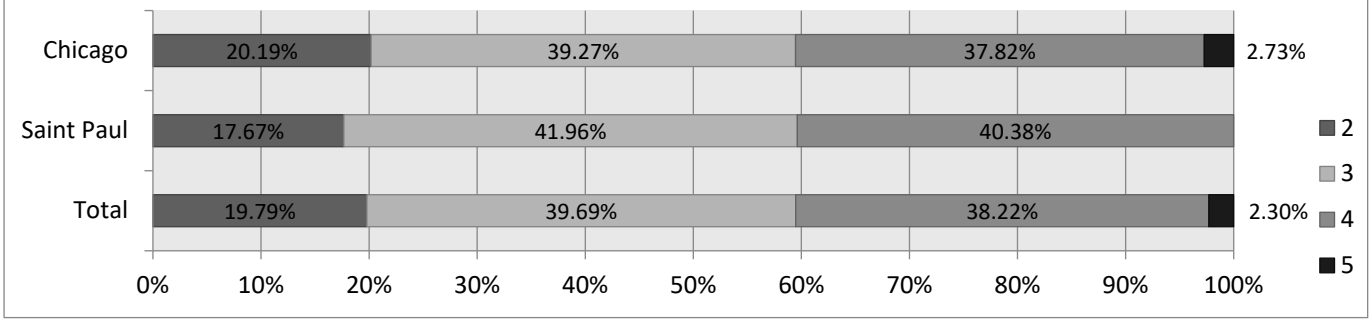
Table 1. Percent of CPC pre-K students whose classroom met CPC recommendations for each ELE indicator

Indicator	Chicago (1,724 students)	Saint Paul[v] (317 students)	Total (2,041 students)
1) Full day	23.7%	0%	20%
2) Low class size	64.6%	40.4%	60.8%
3) Task-oriented classroom	68.5%	82.3%	70.7%
4) Time in key domains	90%	100%	91.6%
5) Balance of instruction	76.3%	100%	80%
Average # of indicators met (out of 5)	3.23	3.23	3.23
Met 3 or more indicators	79.8%	82.3%	80.2%
Met 4 or more indicators	40.5%	40.4%	40.5%

[iv] All CPC classrooms in our sample had both a teacher and a classroom aide, so classrooms that met the recommendation for class size also had a child:staff ratio of 17:2 or lower.

[v] Note that, during the 2012-13 year, Saint Paul Public Schools were unable to offer full-day pre-K.

Figure 1. **Breakdown of CPC pre-K students during the 2012-13 academic year by the number of ELE indicators their classroom met**



Comparison to standard pre-K: To determine whether ELEs distinguish CPC from standard pre-K, we compared the classroom environments experienced by CPC and non-CPC students in the CPC expansion project. Overall, CPC students were more likely than non-CPC students to attend classrooms that met structural ELE recommendations (full day instruction and class size ≤ 17; see Appendix B). Surprisingly, CPC students were *less* likely to experience classrooms that met instructional ELE indicators (task-oriented instruction, time in key domains, and balance of instruction). These results should be interpreted with caution, however, because data used to define the instructional ELE indicators were only available for a small subset of non-CPC classrooms.

Are ELE indictors associated with one another?

Classrooms that show high quality for one ELE indicator may be especially likely to show effectiveness in other areas. To explore this possibility, we examined whether class size was related to task-orientation and use of instructional time (Table 2). Overall, smaller classes were more likely to provide a task-oriented environment and to balance child- and teacher-directed instruction – a finding consistent with the possibility that having fewer students allows teachers to focus on providing more individualized, engaging instruction. Time in key domains showed the reverse pattern, with larger classes more likely to spend at least 65% of instructional time in language/math/science.

Table 2. Percent of CPC pre-K classes meeting instructional indicators, by class size.

Class Size	# of Classes	Task-oriented Classroom	Time in Key Domains	Balance of Instruction
≤ 17	84	71.4%	88.1%	81%
≥ 18	42	66.7%	97.6%	78.6%

Note. Class sizes ranged from 9 to 22

We also examined whether full-day and part-day students were equally likely to receive instruction consistent with the other four ELE indicators (Table 3). Overall, full-day students were much less likely to attend small classes than were part-day students – possibly due to trade-offs made by the district when attempting to provide full-day pre-K but maximize the number of children served. For the other three indicators, there was not a clear pattern.

Table 3. Percent of part- and full-day CPC pre-K students whose class met recommendations for the other four ELE indicators

Indicator	Chicago Full-Day (409 students)	Chicago Part-Day (1,315 students)	Saint Paul Part-Day (317 students)
2) Low class size	26.4%	76.4%	40.4%
3) Task-oriented classroom	75.1%	66.5%	82.3%
4) Time in key domains	89%	90.3%	100%
5) Balance of instruction	87%	72.9%	100%

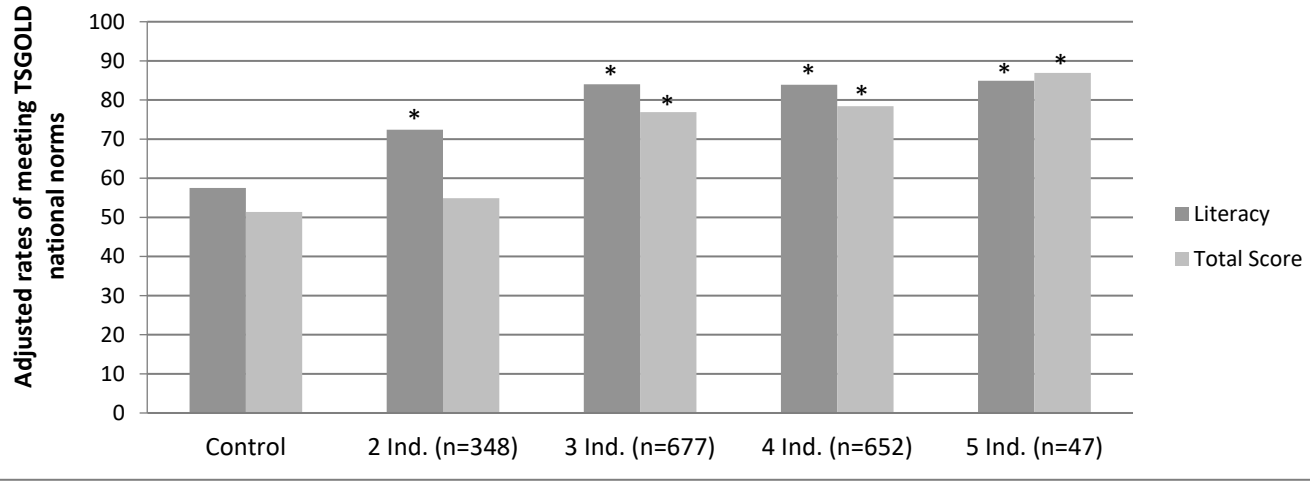
Note. During the 2012-13 school year, Saint Paul did not have any full-day pre-K classrooms

Are effective learning experiences associated with school readiness?

To examine whether CPC-defined effective learning experiences predict school readiness, we compared the end-of-preschool test scores of CPC students whose classrooms met different numbers of ELE indicators with the non-CPC comparison sample. We compared the groups of students receiving different number of ELE indicators against the control group to assess whether or not ELE indicators might help explain the overall impacts of the CPC program, and against one another to test if there was a significant difference in achievement by the number of indicators received.

In Chicago, students are assessed by their teachers using Teaching Strategies GOLD, a validated assessment that is completed by the teacher rating each child on their skill level in multiple domains in the fall, winter and spring of the preschool year.[16,17,18] Figure 2 shows the association between number of ELE indicators met and CPC students' likelihood of meeting national norms on the TS GOLD scores in the spring of their preschool year for Chicago students only. All effects are calculated relative to the non-CPC comparison group.

Figure 2. **Rates of meeting TS GOLD norms by number of ELE indicators in Chicago**



*Difference (relative to the non-CPC control group) is statistically significant at $p < .05$

In comparison to students attending non-CPC preschools, CPC students with a higher number of ELE indicators were more likely to reach the national norm on the literacy subtest and on the TS GOLD overall (defined as meeting norms in five of six key domains – language, literacy, math, cognitive, physical, and social-emotional).

Students who experienced all five ELE indicators saw a 35 percentage point increase in likelihood of meeting the national norm in at least five of six domains compared to non-CPC students. These students also significantly outperformed other CPC students who experienced two, three or four ELE indicators. On the low end, while CPC students with only two ELE indicators were significantly more likely than non-CPC students to meet the literacy TS GOLD norm, there was no significant difference between the two-ELE-indicator CPC students and the control group for the total TS GOLD score.

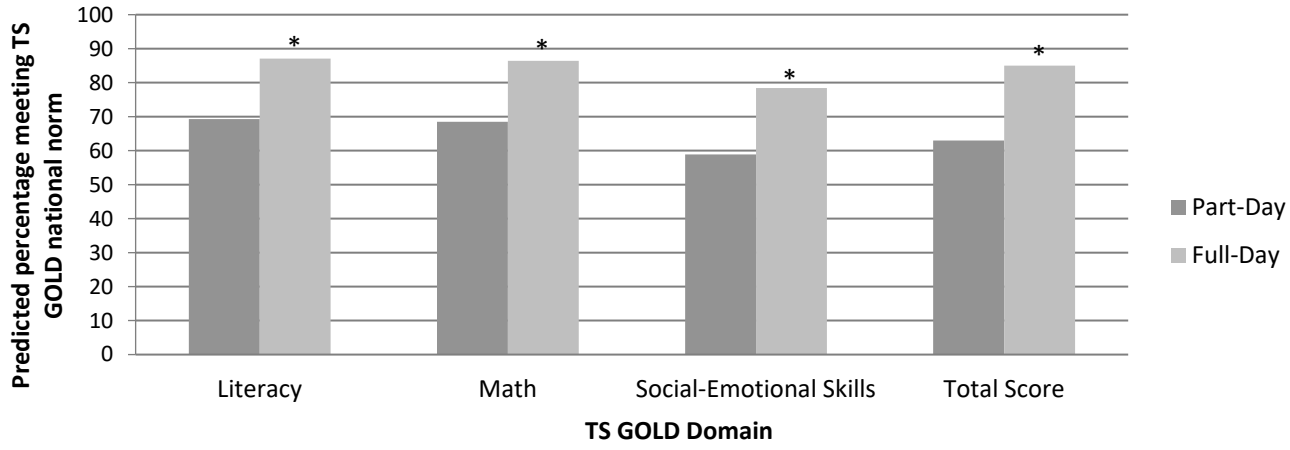
In Saint Paul, a combination of the Individual Growth and Development Indicators (IGDI) and the Phonological Awareness Literacy Screening (PALS) instruments was used for preschool language and literacy assessments. IGDI's three measures are Picture Naming, Rhyming, and Alliteration and PALS' four measures are Lower and Upper Alphabet knowledge, Concepts about Print, and Name Writing, which are valid measures of estimating early language and literacy development and are predictive of later literacy skills.[19,20,21,22]

Students from CPC classrooms consistently outperformed students from non-CPC classrooms on end-of-preschool language and literacy assessments (the IGDI and PALS). However, among CPC classrooms, there was not a

consistent pattern relating number of ELE indicators met to school readiness – possibly due to the small number of classrooms and limited variability in the number of ELE indicators they met. Variation in class sizes was very limited, which reflected that sites met most program requirements.

Impact of Full Day Programming: The association between full-day instruction and student outcomes was only analyzed in Chicago, because Saint Paul did not provide full-day instruction during the 2012-13 year. At the end of the year, students attending full-day classrooms had higher scores than part-day students across multiple domains of the TS GOLD assessment (see Figure 3). Students that attended CPC full-day programming outperformed both CPC and control part-day students (no control sites offered full-day preschool). In response to these results, schools in Chicago and St. Paul increased the availability of full-day classrooms.

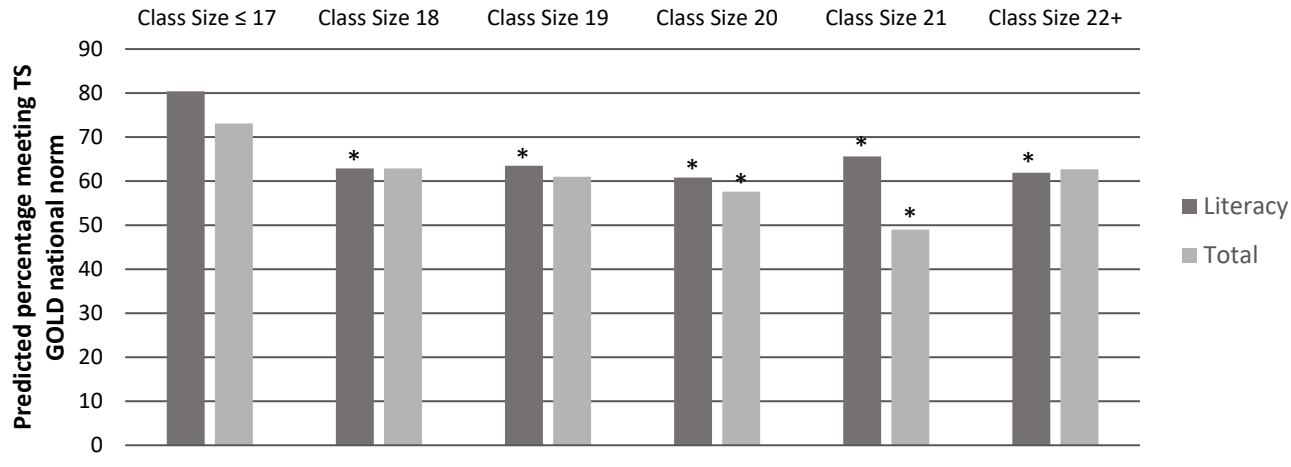
Figure 3. **Association of part- vs. full-day instruction and TS GOLD scores in Chicago**



*Difference between part- and full-day is statistically significant at $p < .05$

Impact of Class Size: In Chicago, attending a class with 17 or fewer students was associated with greater school readiness at the end of preschool, compared to attending a class with 20 or more students (see Figure 4). There was no difference in achievement between classes of 17 or less and classes of 18 or 19 on the total TS GOLD score. However, every class size above 17 performed significantly worse on the TS GOLD literacy assessment. These analyses controlled for full-day pre-K, baseline achievement, and other factors.

Figure 4. **Association between class size and TS GOLD scores in Chicago**

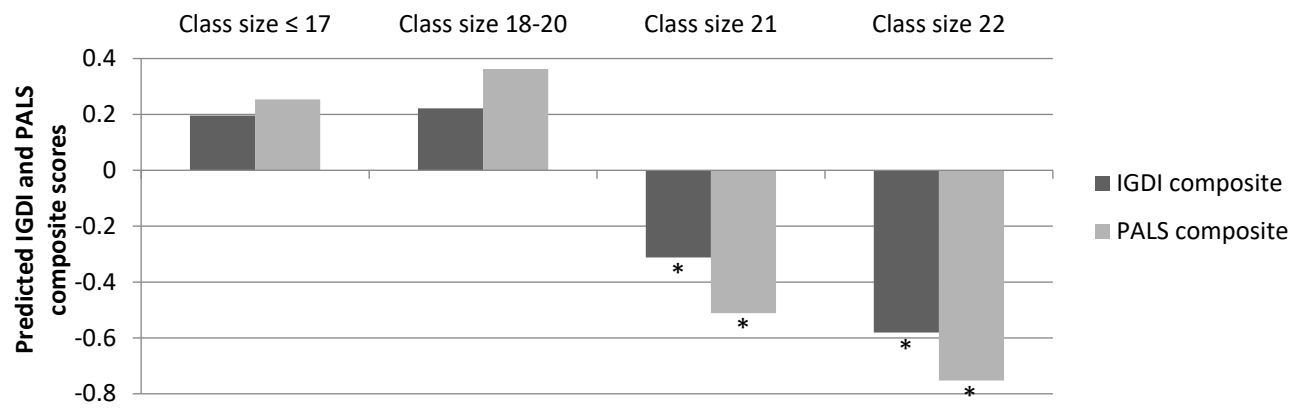


*Difference (relative to the class size ≤17 group) is statistically significant at $p < .05$

Analyzing the entire distribution of class sizes from 9 to 22, assuming a linear relationship with outcomes and controlling for full-day pre-K and other factors, each additional student in the class was associated with a 3.6 point decline in TS GOLD total scores. Extrapolating to effect sizes in standard deviations, this indicates an effect size of .20 in going from 20 to 17 students per class, and .33 in going from 22 to 17 students per class.

In Saint Paul, attending a class with 17 or fewer students was associated with greater school readiness at the end of pre-K, compared to attending a class with over 20 students (see Figure 5). This finding is consistent with the Chicago finding on TS GOLD total scores, although IGDI and PALS are only language/literacy assessments. Scores were similar between students attending classes of 17 or fewer and 18 to 20, although this varied by outcome. Note that the small sample sizes restricted power considerably.

Figure 5. **Association between class size and language/literacy in Saint Paul**



*Difference (relative to the class size ≤17 group) is statistically significant at $p < .05$

The overall pattern showed higher school readiness as class size declined. Controlling for baseline achievement and other factors, each added student was associated with a reduction of approximately .04 to .06 standard deviations. Thus, a drop from 20 to 17 students was linked to an improvement of about .15 standard deviations; a reduction of 5 students (e.g., 22 to 17) was associated with a .25 standard deviation improvement. These changes assume a linear relation between class size and outcomes. These findings are supported by observed performance advantages of the 2012-13 CPC cohort over the 2013-14 cohort enrolled in the usual classes of 20 students.

Conclusions

- CPC expansion provides a unique opportunity to document the contribution of effectiveness elements to student learning. Its long history of effectiveness has direct implications for policy and practice.
- The CPC program element of effective learning experiences (ELEs) can be summarized in terms of five measurable program and classroom characteristics.
- CPC preschool classrooms in the first year of the CPC Midwest Expansion Project largely met more than half of these effective learning experience indicators.
- There is evidence from Chicago schools that meeting more ELE indicators is associated with a greater boost in school readiness at the end of preschool, relative to non-CPC comparison students. This suggests that effective learning experiences may be driving some of the documented CPC program effects (more so in Chicago than Saint Paul), when other CPC elements are not considered.
- Structural program characteristics (full-day programming and low class size) were reliably associated with greater school readiness at the end of preschool. Low class size was associated with higher school readiness in both Chicago and Saint Paul – class sizes over 20 were linked to lower rates of proficiency.

Future Directions

- On-going analyses will examine the impact of the ELEs and other indicators through 3rd grade, and the role of effective learning experiences measured in kindergarten through 3rd grade.
- Explore the contribution of teacher background characteristics (level of education, specialization, professional development, etc.) to student outcomes.
- Examine the contributions of the other CPC elements to student learning, and their alignment to the Gates Foundation framework.
- Assess which combinations of elements make the largest difference in students' achievement.

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Appendix A: Core Elements of Early Childhood Programs and Services and Linkage to Key Principles of Effectiveness

CPC P-3 Program Elements[23] **Reynolds et al. (2016)**	**Essential Elements of High-Quality Pre-K**[24] **Gates Foundation (2015)**	**Zigler et al. (2006)**[25]	**NIEER (2017)**[4]	**Key Principles**[10] **Ramey & Ramey (1998)**
Collaborative Leadership - A team led by head teacher to create a strong learning climate - Delegated responsibilities for curriculum, family support	Strong leadership Integrated system of learning goals, curriculum, professional development, formative assessments, and data	Monitoring system with on-site observation	Continuous quality improvement system	Environmental maintenance of development
Effective Learning Experiences - Small classes (<18 in prek; < 26 in K-3) - Balance of teacher- and child-directed instruction - Extended learning time, including full-day, multi-year programs - Teacher has BA degree; Assistant has CDA, AA degree, or equivalent - Engaged in learning and instruction	Maximum class size of 22, adult:child ratio between 2:15 and 2:22 Two adults in the classroom Learning time: 6-6.5 hours per day, 180-205 days per year Support for Dual Language Learners Support for students with special needs Teacher-child interactions focused on learning	Maximum of 10 children per teacher or assistant teacher Teacher with BA and EC specialization; Assistant with CDA or equivalent Full-day and two-year option	Maximum ratio of 10 children per staff member Maximum class size of 20 Teacher has BA degree Teacher has specialized training Assistant has CDA or equivalent	Developmental timing Program intensity Direct provision of learning experiences Individual differences in program benefits
Aligned Curriculum & Practices - Evidence-based curriculum - Annual curriculum alignment plan - Across-grade collaboration	Age-appropriate learning standards Proven (research-based) curriculum Formative assessments Data-driven decision making	Curriculum is evidence-based	Comprehensive learning and development standards that are horizontally and vertically aligned, supported, and culturally sensitive	Implement new curricula for increased effectiveness
Parent Involvement & Engagement - Menu-based system of home and school support - Annual parent involvement plan - Parent resource teacher and outreach worker - Physically located parent room - Needs assessment		Parent involvement plan	Health screenings and referrals	Program breadth and flexibility
Professional Development - In-person and on-line coaching support - Site mentors - Review of on-line modules	Ongoing professional development focused on teacher-child interactions Education and compensation: Teachers have a B.A. and early learning credential, and are compensated at the same level as K-3 teachers	System of in-service training for all staff Teachers are compensated at rates competitive with schools	15 hours/year of professional development, individualized professional development plans, and coaching for lead and assistant teachers	Individual differences in program benefits Program intensity
Continuity and Stability - Participation from preschool to 3rd grade - Co-location or close proximity - Outreach efforts to reduce mobility	Public support from elected officials, courts and the policy environment	Funding levels support high quality of programs	Supports for curriculum implementation	Environmental maintenance of development

Note. Some elements may span multiple categories, but have been assigned to the one that fits most closely.

Appendix B:
Supplemental descriptive tables

Table B1. Comparison of task-orientation ratings from the Classroom Learning Activities Checklist (CLAC) across CPC and non-CPC preschool classrooms in the CPC Midwest Expansion Project.

	# of Classrooms	Score range	Metric	% of Classrooms Meeting Metric
CPC	64	1 (Low) to 5 (High)	Score of 4 or 5 on task-orientation item	81%*
Comparison group	8			50%*

Note. Data were collected in the spring of 2013 across all school districts participating in the Midwest Expansion Project.
*Percentages are significantly different ($p < .05$).

Table B2. Background characteristics of CPC pre-K teachers in Chicago and St Paul during the 2012-13 school year (data available for 53 out of 65 teachers in Chicago, and 9 out of 10 teachers in Saint Paul).

	Chicago (53 teachers)	Saint Paul (9 teachers)	Total (62 teachers)
% with a Bachelor's degree	24.5%	55.6%	29%
% with a Master's or professional degree	75.5%	44.4%	71%
% with specialization in early childhood education	71.7%	66.7%	71%
Average years of teaching experience[1]	13.5 (10.8)	12.3 (7.9)	13.3 (10.4)
Average years of experience teaching preschool[1]	7.5 (7.7)	7.6 (4.8)	7.5 (7.4)

[1]Standard deviations in parentheses

Table B3. Classroom environments experienced by non-CPC pre-K students during the 2012-13 school year (Chicago and Saint Paul combined)

Indicator	Non-CPC students with data	**% Non-CPC students** whose class met recommendation	% **CPC students** whose class met recommendation
1) Full day	1,115	0%	20%
2) Low class size	1,115	16.9%	60.8%
3) Task-oriented classroom	509	79.6%	70.7%
4) Time in key domains	153	100%	91.6%
5) Balance of instruction	196	100%	80%

Appendix C:
Breakdown of ELE indicators met by sub-groups of students in Chicago and Saint Paul

***Part-day Classrooms**:* Recognizing that the provision of full- day programming is often beyond the control of school administrators, below we describe the classroom environments experienced by part-day CPC students in terms of the other four ELE indicators.

Table C1. Percent of **part-day** CPC pre-K students whose class met recommendations for the other ELE indicators

Indicator	Chicago (1,315 students)	Saint Paul (317 students)	Total (1,632 students)
2) Low class size	76.4%	40.4%	69.4%
3) Task-oriented classroom	66.5%	82.3%	69.5%
4) Time in key domains	90.3%	100%	92.2%
5) Balance of instruction	72.9%	100%	78.2%
Average # of indicators met (out of 4)	3.06	3.23	3.09
Met 3 or more indicators	73.5%	82.3%	75.2%
Met all 4 remaining indicators	32.6%	40.4%	34.1%

Special Populations: The quality of the learning environment may be especially critical for children who are at an early developmental stage or at risk for academic difficulties. In our CPC sample, we found that these groups generally experienced classroom environments comparable to other children in their district.

Table C2. Classroom environments experienced by sub-groups of CPC pre-K students in Chicago and Saint Paul

	# of students	Average # of indicators met	Met 3+ Indicators	Met 4+ Indicators
Chicago Public Schools				
Spanish-speaking dual language learners	469	3.41	96.6%	44.3%
Receiving special education services	166	3.38	90.4%	47.6%
Not meeting norms at start of year[1]	1,537	3.24	80.7%	40.5%
Three-year-olds	697	3.10	72.2%	37.4%
Saint Paul Public Schools				
Dual language learners	213	3.27	86.9%	40.4%
Receiving special education services	31	3.03	71%	32.3%

[1]Not meeting norms was defined as meeting national norms on fewer than three of the TS GOLD subscales.