Pre-K to Elementary Experiences and Outcomes Among Preschool For All Students in San Mateo County, CA

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Introduction

There is widespread agreement that high quality preschool programs can improve children's short-term educational and social outcomes, particularly for low-income and minority students. Evidence from a small set of longitudinal studies also indicates that preschool attendance can improve long-term outcomes such as employment and criminal activity. Most recently, the policy focus has been on four-year old students in their pre-kindergarten (pre-K) year, emphasizing that this is an important year for growth and development that can vastly improve students' kindergarten experiences and outcomes. Because preschools are generally private (Head Start is the most notable exception), many states moved to fund universal or targeted pre-K programs intended to address the needs of underserved four-year olds.

In 2010, 40 states had some form of state-funded pre-kindergarten (pre-K) programs for four-year olds, but just three states had universal programs intended to serve all students in that targeted pre-K year (Pre-K Now, 2011). These universal programs, sometimes referred to as Preschool for All (PFA), are voluntary and not intended to replace existing preschools that serve three- and four-year olds. Instead, they are intended to level the playing field so that more disadvantaged students, who historically have not attended pre-K at the same rate as their more advantaged counterparts, can enter kindergarten ready to learn.

A total of 1.2 million three- and four-year olds (30% of children in this age group) attended a state-funded preschool program in 2009, nearly double the number attending in 2002 when 17% of these children attended these programs (Barnett, Epstein, Friedman, Sansanelli, & Hustedt, 2009). When including children attending all private preschool programs, 2009 pre-K enrollment increases to three-quarters of four-year olds and just under a fifth of three-year olds.

Although California does not have a universal state-funded pre-K program, the passage

of Proposition 10, the California Children and Families First Act of 1998, paved the way for counties to pursue universal preschool by establishing First 5 Commissions at the state and county levels to attend to the needs of children ages five and younger. In 2005 the California Department of Education (CDE) announced Preschool for All: A First-Class Learning Initiative as a tool for closing the achievement gap (California Department of Education). The initiative proposed state and local polices aimed to prepare the state's three and four-year olds for success in kindergarten through second grade. California still lags behind other states in its state-funded preschool efforts, however, with just 9% of three- and four-year olds attending (Barnett et al., 2009). In San Mateo County, located in the San Francisco Bay Area, the First 5 Commission partially used funding to support Preschool for All San Mateo County, a five-year demonstration project aimed at supporting high-quality preschool opportunities for children in the county. During this period PFA provided preschool experiences to over two-thousand children and families in the community.

Although the literature on preschool effects is quite large, there are far fewer studies examining PFA programs, particularly those at the local level. In this article, we study San Mateo County's PFA program, tracking children who attended PFA as three- and four-year olds through first grade in one affiliated school district in Redwood City. We link administrative data from PFA to school records in order to assess the extent to which PFA students succeed academically once they enter kindergarten and whether their academic performance progresses over time. Redwood City School District includes a majority of Latino and low-income families, making it an ideal setting to study the effects of preschool programs on academic performance for traditionally underperforming students.

Literature

Addressing the gap in pre-kindergarten experiences is one of the most effective public policies for improving outcomes for low-income, minority, and otherwise at-risk children through increases in early cognitive ability and social skills, and has been linked to improved community outcomes such as reduction in crime, non-marital childbearing, and high school dropout (Heckman & Masterov, 2007). Children from disadvantaged backgrounds are consistently found to exhibit lower academic achievement in school than their non-disadvantaged peers (Jencks & Phillips, 1998; Sirin, 2005), a gap that can be seen as early as kindergarten (Bridges, Fuller, Rumberger, & Tran, 2004; Cannon & Karoly, 2007). This is an important gap because research shows that children who begin school behind their peers tend to stay behind (Alexander, Entwisle, Blyth, & McAdoo, 1988; Phillips, Crouse, & Ralph, 1998). Importantly, these disadvantaged children are less likely to have a quality pre-kindergarten experience than their non-disadvantaged peers (Pianta et al., 2005).

Much research has investigated the effects of preschool and, as a result, there is a vast literature spanning decades. The earliest studies, many from the 1970s, have been able to measure long-term outcomes for participants well into adulthood and middle-age, including rates of high school completion, college attendance, earnings, and involvement with crime, among others. While some studies examine preschool participants' intermediate-term outcomes in elementary, middle, and high school, the majority focus on outcomes that occur in the immediate (the year following enrollment in preschool) and short-term (kindergarten, and first grade). This paper addresses similar short-term outcomes for preschool participants.

Research on the immediate- and short-term effects of preschool suggests that preschool attendance influences children in a variety of ways, particularly those from low-income and

high-risk backgrounds. The largest documented positive outcomes for preschool attendees have come from experimental analyses using small-scale preschool programs (Lazar et al., 1982). These are some of the earliest and most influential evaluations of preschool programs, including the HighScope Perry Preschool Program (originally the Perry Preschool Project), the Carolina Abecedarian Project, and the Chicago Child-Parent Center (CPC) Program. It has been widely noted that cost and scalability pose a significant hurdle for using these types of programs on a state or national level, making the results less meaningful for these settings. To that end, a number of studies have been conducted using non-experimental data from federal, state, and local public preschool programs. Results from these analyses are similar to those for the model programs.

Several studies document immediate effects for children that include increases in IQ and higher scores on developmental and academic preparedness tests by the end of preschool (Frede, Jung, Barnett, Lamy, & Figueras, 2007; Gomby, Larner, Stevenson, Lewit, & Behrman, 1995; Gormely Jr., Gayer, Phillips, & Dawson, 2005; Huffaker & Morris, 2011; Wong, Cook, Barnett, & Jung, 2008). Non-academic short-term effects have also been acknowledged, including reduced rates of grade repetition and special education placement for preschool participants, compared to those who do not attend (Anderson et al., 2003; Gilliam & Zigler, 2000; Gomby et al., 1995; Ramey & Ramey, 2004). Research that follows preschool attendees into kindergarten supports the idea that preschool plays an important role in helping children become kindergarten-ready, including learning routines and behaviors that are expected of children in kindergarten, and links preschool attendance to academic success in kindergarten.

For example, Magnuson, Meyers, Ruhm, & Waldfogel (2004) find positive results for preschool participants in each of these areas, reporting their superior performance on tests of

reading and math upon kindergarten entry, persistence of this advantage at the end of kindergarten and first grade, and a reduced incidence of being retained in kindergarten. They also found these effects to be the largest for disadvantaged students. Large effects for at-risk students through first grade are also found for publicly-funded preschool programs (Lee, Brooks-Gunn, & Schnur, 1988; Lee, Brooks-Gunn, Schnur, & Liaw, 1990) and has also been documented in the early elementary years for children attending a model preschool program through third grade (Slaby, Loucks, & Stelwagon, 2005). Children participating in state-run preschool programs exhibit positive outcomes similar to those in private preschool in the longer-term, including high school completion, college attendance, earnings, and reduced involvement with crime, though these varied by race (Garces, Thomas, & Currie, 2000).

Some studies have found that positive effects occurring in the short- and immediate-term may fade out over time, particularly for increases in IQ, while other outcomes persist over time, notably academic performance (Gomby et al., 1995; Iowa School Boards Foundation, 2007; Miller & Bizzell, 1983). Few studies explicitly examine the reasons behind this fading out, but explanations posed include low school quality (Currie & Thomas, 2000; Lee et al., 1990), elementary classroom experiences (Magnuson, Ruhm, & Waldfogel, 2007), and the importance of the transition to formal schooling for at-risk students (Gomby et al., 1995; Schulting, Malone, & Dodge, 2005). Another possible explanation is the duration of preschool experience, but only a few studies evaluate outcomes for students based on the duration of preschool attendance. They find, however, that students participating for two years exhibit higher scores and better outcomes than students attending for one year only (Barnett & Lamy, 2006; Frede, Jung, Barnett, & Figueras, 2009; Frede et al., 2007; Reynolds, 1995). The most consistent findings among preschool effectiveness studies are: (1) the greatest effects of preschool attendance are seen in

low-income and minority children; and (2) those who attend preschool have reduced grade retention and placement into special education during elementary, middle, and high school.

This analysis of PFA in San Mateo County takes a comparable approach to other research conducted on publicly-funded preschool programs, using a non-experimental analysis. We rely on administrative data from a state preschool program linked to a local school district to examine student outcomes. By using a student's academic record to measure outcomes, we are able to see how students actually fare in the classroom, rather than relying on tests that quantify cognitive development or academic achievement in non-school based settings. The study adds to the existing literature by examining, among others, outcomes for students who go on to receive federal Free and Reduced Price Lunch, students who participate in PFA for one year or two years, and students who attend the same school site in kindergarten as they did for preschool. Results are also presented by students' English learner status, levels of parent education, and the student's receipt of special education services. It also contributes to the literature by using an individually linked database constructed from data systems collected in the community by preschool programs and school districts. There is a dearth of linked administrative data available to examine this issue (Early Childhood Data Collaborative, 2010) and this study offers an early approach to that kind of analysis.

Data and Methods

This study relies on data from the Youth Data Archive (YDA), a collaboration between the John W. Gardner Center for Youth and Their Communities (JGC) and Bay Area school districts, city and county agencies, and community-based organizations. Partners contribute data that are then linked individually across sources and over time, creating a longitudinal record of

each youth's schooling, program participation, and service receipt within their communities. In partnership with contributors, the YDA uses this longitudinal dataset to support community partners to make data-driven policy and programmatic decisions to improve outcomes for youth.

PFA and Redwood City School District Data

This analysis was conducted at the request of the San Mateo County Office of Education (SMCOE) and the Redwood City School District (RCSD), both long-time partners of the YDA. San Mateo County's PFA program contracted with public school districts, non-profit agencies, and family-based child care providers to provide preschool services to five cohorts of children between June 2004 and June 2009. With a goal of improving program quality, PFA set quality standards for partners and supported partners to meet these standards with funding for professional development and program assessment and quality improvement. PFA classrooms were capped at 24 children, and had a minimum staff-child-ratio of 1:10. Teachers were required to have a college degree and special training in Early Childhood Education. Curricula were developmentally appropriate and individualized to students. PFA also required mandatory screenings and developmental assessments of all children, and promoted family engagement and supporting home languages and cultures. PFA also reserved 10% of its preschool slots for children with special needs.

For this analysis, we individually linked participants from PFA to RCSD using confidential identifiers such as name, address, date of birth, gender, and ethnicity. We include PFA data from the 2006-07, 2007-08, and 2008-09 school years on child and family demographics and program participation including which PFA location a child attended. RCSD data are from the 2007-08, 2008-09, and 2009-10 school years. Of the 2,084 children who attended PFA between 2006-07 and 2008-09, 876 attended kindergarten in RCSD immediately

following PFA. We are able to follow an additional 497 students into first grade in RCSD (one PFA cohort had not yet reached first grade at the time of this analysis). Table 1 illustrates how many children we follow from each PFA cohort year into kindergarten and first grade in RCSD. PFA graduates made up 26% of all RCSD kindergartners between the 2007-08 and 2009-10 school years, and 23% of first graders in 2008-09 and 2009-10.

RCSD school records include student information such as demographics, parent education, Free or Reduced Price Lunch status, language proficiency, special education status, and academic and classroom progress as reported on student report cards. The California Standardized Test (CST), a commonly used indicator of academic success, is not administered to children until second grade. As a result, this analysis focuses on the academic and classroom progress data documented in each student's report card.

Kindergarten and first grade report cards include a variety of measures including both academic subjects and child behavior and development. This study focuses on five subjects from the report card: math, listening/speaking, writing, reading, and work study skills. We omitted some other subjects, including art and science, because these data were reported less frequently and less reliably across classrooms and schools. The five subjects used in this study consisted of three to eighteen sub-categories. For example, math was made up of 11 sub-categories, including "Uses groups of objects to represent numbers to 10," "Counts numbers to 30," and "Names days of week."[1] The report cards are produced three times a year in RCSD. We counted a student as proficient in a subject if he was proficient on *all* of that subject's sub-categories in *any* of the three report card periods. While the majority of children had assessments in all of a subject's sub-categories in at least one report card period, fewer children had complete assessments in all three report card periods. This varied greatly by classroom and school and we believe teachers

[1] A full list of sub-categories is available from the authors upon request.

are allowed a great deal of discretion in how they complete these report cards for their students. Gaps in reporting may have been due to a number of reasons including child absence or the child already having achieved proficiency in a subject in a prior grading period. However these reasons are not noted in the report card. As a result, we were unable to measure a child's progress from their first to last report cards in either kindergarten or first grade, and instead focused on their highest achievement at any point during each of these grades.

There are also important differences in the kindergarten and first grade report cards. While the same subjects are assessed in each, the number and content of sub-categories changes from kindergarten to first grade. For example, while in kindergarten there were eleven sub-categories that contributed to a student's overall proficiency in math, there were eighteen math sub-categories on the first grade report card. Assessments changed from things like "Names days of week" in kindergarten to "Tells time to the nearest half hour on analog clock" in first grade. The number of sub-categories contributing to each subject proficiency score also increased in reading and writing between these two grade levels. As a result, it became more difficult for a student to be proficient in all sub-categories of a subject and therefore more difficult to be defined as proficient in a subject overall. We therefore saw a proficiency drop-off for many students from kindergarten to first grade. We feel confident that this drop-off is largely the result of changes in the report card itself, in conjunction with how we defined proficiency for the purposes of this report (as described above). We do not believe that the changes described above reflect true decreases in student knowledge.

Methodology

We use linear probability models to assess the overall effects of PFA participation on report card measures for all children in kindergarten and first grade in RCSD, controlling for a

range of demographic and school-related factors. All models were also tested using logistic regression with comparable results. We report results from linear probability models for ease of interpretation. We also examine the effects of PFA participation on kindergarten and first grade report cards specifically for children who are traditionally underserved by preschool programs: racial and linguistic minorities, children from low-income families, children whose parents had low levels of educational attainment, and special needs children. We use interaction variables to isolate the effect of PFA participation within these particular sub-groups of children. Finally, we examine the effect of two programmatic inputs: participation in PFA for one versus two years and attending a community school during kindergarten or first grade.

Findings

Demographics and Enrollment

With an aim of ensuring "access for all three and four year olds to high quality care and education that promotes success in school and life"(San Mateo County Office of Education, n.d.), PFA San Mateo targeted the county's highest-need children and families by serving low-income neighborhoods and reserving 10% of its preschool slots for children with special needs. As a result of this targeting, there were significant differences in the demographics and kindergarten enrollment trends of children who attended PFA and children who entered RCSD in kindergarten, but did not attend PFA (Table 2).[2] Eighty-two percent of children who attended PFA were English learners, compared to 59% of non-PFA children; 92% were Latino compared to 68% of non-PFA children; 68% received Free or Reduced Price Lunch in kindergarten compared to 52% of non-PFA children; and 89% had a parent whose highest educational attainment was high school or less compared to 71% of non-PFA children. Children who

[2] Note: These children may have attended another preschool program that was not funded by PFA.

attended PFA were also much more likely than children who had not attended PFA to attend one of four elementary schools that had a PFA program located on campus. This suggests that PFA sites were located in high-need areas and served children and families primarily in the communities surrounding these locations. Children who attended PFA had similar gender and age ranges to children who did not attend the program.

Among PFA participants, we found important demographic differences between children who attended the program for two years—at ages three and four—and children who only attended at age four (Table 3). Children who attended PFA for two years were more likely than children who attended for only one year to be English learners (93% and 80%, respectively), receive Free or Reduced Price Lunch in kindergarten (75% and 67%), and have a parent who did not complete high school (57% and 47%). Children attending PFA for two years were also older on their first day of kindergarten than children who attend PFA for one year; 60% of children attending the program for two years were 65 months or older at the start of kindergarten compared to 39% of children who attended the program for only one year. In RCSD, children must turn five (60 months) by December 2nd in order to enroll as kindergarteners in that school year. Children in the program for two years were also more likely to attend an elementary school that did not have PFA on-site (49% compared to 42%). Children in both groups were overwhelmingly Latino. Though PFA did not explicitly target different types of families for enrollment at age three or at age four, these demographic differences indicate that families who enrolled their children at younger ages may have been linked to other community or social services to learn about the program earlier.

Kindergarten and First Grade Outcomes

As expected with these differences in demographics, children who attended PFA had

lower raw proficiency rates than children who did not attend PFA in all kindergarten report card subjects studied here: Language arts listening/speaking (LALS), language arts reading (LAR), language arts writing (LAW), math (MATH), and work study skills (WSS). Controlling for these differences, Table 4 shows the effect of ever attending PFA on kindergarten outcomes. After controlling for background characteristics, children who attended PFA had proficiency rates equal to those of children who did not attend PFA in listening/speaking, reading, writing, and work study skills. In math, children who attended PFA had significantly higher (β=.045) rates of proficiency. Other variables included in the model had the expected effect on kindergarten outcomes. These included negative effects on the kindergarten report card for early English learners, receipt of Free or Reduced Price Lunch, having a parent who attained a high school education or less, Latinos and other ethnic minorities, and special needs children. Beginning kindergarten at 65 months (five years, five months) or younger also had a negative effect on kindergarten outcomes. We included school of attendance in early versions of the model but found that including these variables in the model did not change the results for other variables and we ultimately excluded it. This model does not include interaction variables.

Because PFA targeted low-income and high-need children and families, in subsequent models we interacted PFA participation with demographic variables in order to measure the effect of PFA on the kindergarten outcomes of particular sub-groups of students (Table 5). Findings suggest that attending PFA had positive effects on the outcomes of the highest-need students, particularly in math and work study skills. Among English learners with the least English language ability (levels 1, “Beginning”, and 2, “Early Intermediate”, out of 5 on the kindergarten report card), children who attended PFA had significantly higher proficiency rates in math (β=.059) and work study skills (β=.065) than English learners who had not attended

PFA. For this analysis, children at levels 4, "Early Advanced," and 5, "Advanced," are not considered English learners. Higher level English learners (level 3, "Intermediate," on the kindergarten report card) who attended PFA also had higher math scores (β=.074) than high-level English learners who had not attended PFA. In other subjects, English learners at all levels who attended PFA had similar proficiency rates to English learners who did not attend PFA. Latino children who attended PFA had significantly higher proficiency rates in reading (β=.039), math (β=.058), and work study skills (β=.039), than Latinos who did not attend PFA and similar rates in listening/speaking and writing. Among children who received Free or Reduced Price Lunch, children who attend PFA had significantly higher proficiency rates in writing (β=.043) and math (β=.071) than those who did not attend PFA and similar rates in the other subjects. Among children whose parents had not completed high school, children who attended PFA had higher proficiency rates in math (β=.080) and work study skills (β=.066). Proficiency rates in other subjects remained similar for children who did and did not attend PFA. Finally, we also found that for children with special needs, those who attended PFA had much higher proficiency rates in math (β=.160) and work study skills (β=.159) than special needs children who did not attend PFA. Special education students who attended PFA also had higher proficiency rates in listening/speaking (β=.034), reading (β=.100), and writing (β=.041) than those who did not attend PFA, though these findings were not statistically significant.

In first grade, children who attended PFA still had lower raw proficiency rates than children who did not attend PFA in all report card subjects. As in kindergarten, when we control for demographic differences between these two groups of children, we find that children who attended PFA had similar proficiency rates to children who did not attend PFA in all subjects (Table 6). Again, we found negative effects on the first grade report card for some other

variables included in the model: English learners, receipt of Free or Reduced Price Lunch, having a parent who attained a high school education or less, Latinos and other ethnic minorities, and special needs children. As in kindergarten, these negative effects were expected.

Table 7 illustrates the effect of PFA on first grade outcomes for particular sub-groups of children likely to have been targeted by the program. In first grade, we found a smaller effect of PFA participation on report card measures than we found in kindergarten for these subgroups. We found statistically significant effects only among early English learners, with children attending PFA demonstrating higher proficiency rates in work study skills (β=.076) than early English learners who did not attend PFA. In other subjects and for other sub-groups, children who attended PFA performed similarly to children who did not attend PFA. This drop-off in effect may be accounted for by the decrease in the number of PFA participants we were able to follow to first grade. While we were able to follow 876 PFA participants into kindergarten, we were only able to follow 497 PFA participants into first grade, as one cohort had not yet reached this grade level by the time of our analysis. Conducting the first grade analysis on a larger population of students may yield more statistically significant findings.

One and Two Year PFA Participation

Approximately 17% of PFA participants attended the program for two years at both ages three and four. As discussed previously, children attending the program for two years were more likely to be English learners, receive Free or Reduced Price Lunch in kindergarten, and have a parent who did not complete high school than children who attended the program for one year. They were also more likely to be 65 months or older at the start of kindergarten. Table 8 illustrates the effects of one and two years of PFA on kindergarten outcomes. A single year of PFA was associated with kindergarten proficiency rates that were similar to those of children

who did not attend PFA in all five subjects. Attending PFA for two years, however, had large, significant effects on kindergarten outcomes for participants. Two-year PFA participants had significantly higher kindergarten proficiency rates than children who had not attended PFA in listening/speaking (β=.095), reading (β=.093), and math (β=.104). Two-year participants had slightly higher, but not statistically significant, proficiency rates in writing (β=.040), and work study skills (β=.060).

By first grade, the effects of attending PFA for two years were even larger. While children who attended the program for one year had proficiency rates in all subjects that were equal to those of children who did not attend PFA, children who attended PFA for two years had significantly higher first grade proficiency rates than non-PFA children in listening/speaking (β=.127), reading (β=.193), and writing (β=.144). They also had higher proficiency rates in math (β=.086) and work study skills (β=.045), though these findings were not statistically significant.

Community School Attendance

Thirty-nine percent of PFA participants and 24% RCSD kindergarteners overall attended one of RCSD's three elementary community schools. In first grade, 42% of PFA participants attended and 23% of all RCSD first graders attended a community school. Community schools offer family and child services not usually offered by traditional elementary schools and which often resemble the wrap-around family and social services offered by a high-quality preschool program (including PFA). In RCSD these services vary across the four community schools but include health services, parent engagement specialists, social supports, and out-of-school-time learning opportunities. RCSD community schools are located in the district's lowest-income neighborhoods and serve the district's highest-need children and families. Of the RCSD community schools, two had a PFA on-site. In kindergarten, PFA participants who attended a

community school had significantly higher proficiency rates than participants who did not attend a community school in listening/speaking (β=.130) and reading (β=.106). They also had higher rates in math (β=.050) and lower rates in work study skills (β=-.045), though neither of these findings was statistically significant (Table 9). By first grade, attending a community school had no statistically significant effect on outcomes for PFA participants, though community school attendees still had higher non-significant proficiency rates in all subjects: listening/speaking (β=.044), reading (β=.058), writing (β=.064), math (β=.074), and work study skills (β=.086).

Discussion

The findings from this research are in line with previous research that shows the benefits of preschool. Specifically, we find that although participating in PFA did not necessarily lead to higher kindergarten and first grade proficiency in listening/speaking, writing, reading, math, and work study skills compared to children who did not attend PFA but who may have attended another preschool program, students who attended PFA were equally likely to be proficient in these areas as non-PFA students after controlling for background characteristics (in math, PFA students had higher adjusted proficiency). This is important because PFA students were far more likely to have characteristics that placed them at academic risk, which indicates that overall, the program was able to level the playing field.

When we examined specific sub-groups, we found that students in some of the highest-risk groups were more likely to benefit from PFA. Importantly, those who attended two years rather than just one saw much larger gains over non-PFA students. This speaks to the importance of not just the pre-K year, but also preschool at age three.

Methodologically, this research illustrates the value of using existing longitudinal

datasets to help local communities examine the outcomes associated with their early childhood programs and services. The vast literature on best practices in preschool helped inform the San Mateo County PFA program, but ultimately the program developed here responded to the unique needs of this community. Likewise, this research promotes understanding of these preschool efforts by allowing partners to explore and "drill down" into data from local agencies, and to understand the findings within a local context. While the administrative data used in this research is limited in scope compared to much of the data publicly available on preschool outcomes, they are more relevant to the local community and are therefore important tools for policy and program makers locally.

Limitations

In measuring the effect of PFA, we compare the outcomes of participants to the outcomes of non-PFA participants. There are several important concerns to note in using this population as a comparison group. First, we know from other research in this community that PFA participants were more similar, demographically, to children who did not attend preschool than they were to students with other preschool experiences (Applied Survey Research, 2009). From this research we also know that 83% of kindergarteners in San Mateo County, and 89% of kindergarteners in RCSD, attended some preschool. Unfortunately, we are not able to identify which students make up the 11% of RCSD kindergarteners who did not attend preschool and who most closely resemble PFA participants. In effect, therefore, we are comparing PFA participants to children who, for the most part, attended private preschool. Second, families who enroll their children in PFA may have unobservable characteristics that promote school success for their children including parental motivation, involvement, and value placed on education. We are unable to measure these in the analysis.

Further, administrative data do not account for differences in child or family motivation, parent involvement, or other characteristics that may influence a child's academic outcomes. Report card data, particularly at the early grades measured here, appears to be less standardized, and may reflect teacher subjectivity more than standardized test scores often used to measure academic outcomes.

Future Consideration and Policy Implications

With continued community interest and more years of data, it would be possible to complete a multi-year longitudinal study on PFA students, following them with the Youth Data Archive through elementary and middle school, and into high school as well (a different school district also contained in the YDA). The YDA could also be used to track the types of community school services that PFA families access and the other community support services utilized, to account for these in understanding the long-term effects of PFA. The analysis would be enriched, however, with the presence of more county school districts. We are currently working with other districts in order to bring their data into the YDA to enhance this and other analyses.

As mentioned in the introduction, PFA San Mateo County is no longer operating. The results of this analysis have provided fuel for county officials to attempt to revive the program. But, in today's economic climate this is a challenging endeavor. Indeed, state funding for preschool has slowed down in recent years and in two-thirds of states with publicly funded preschool, spending per child dropped between 2008 and 2009 (Barnett et al., 2009).

Still, the analysis provides important information to local and other policymakers as they continue to consider how to best serve students. First, the analysis supports the notion of targeted preschool services. Although universal services may be more appealing in some areas,

in Redwood City targeting services to those in greatest need was effective in leveling the playing field. Second, the analysis shows that two years of preschool experience is far better than one. It is possible that this finding relates more to the underlying motivations of families who send their children for two years instead of one, but being intentional about this and studying the effects of that programmatic change will be important in designing the next wave of programs.

Finally, this analysis shows the importance of collecting high quality data on students' preschool experiences and using common identifiers in order to be able to link preschool data to elementary data. These and other important considerations for longitudinal tracking systems at the state-level are discussed in Early Childhood Data Collaborative (2010). For local purposes, it is very important for county and school district officials to be able to understand the effectiveness of programs that were specifically designed for their locale and the specific populations within it. This analysis demonstrates the types of analyses that can be conducted when local data linking is available.

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Table 1: RCSD Enrollment for PFA Participants by Year (Non-Duplicated)

PFA Cohort Year	Number of PFA Students		
	Attended PFA	RCSD Kinder	RCSD 1st
2006-07	614	272	215
2007-08	701	289	282
2008-09	769	315	N/A
Number of Students All Years	*2,084*	*876*	*497*
Percent of RCSD Grade Level		*25.2%*	*23.2%*

Note: For students who attended PFA for multiple years, PFA cohort year is defined as their final year in PFA.

Table 2: Demographics of PFA Participants and RCSD Kindergarteners, 2006-07 to 2008-09

	PFA	Non-PFA
Female	50.8%	47.5%
English Learner	81.6%	49.1%
Free or Reduced Price Lunch	68.2%	44.3%
Ethnicity		
Latino	92.5%	58.6%
White	4.6%	30.2%
Other	3.0%	10.6%
Parent Education		
Some College	8.1%	34.3%
High School Graduate	39.9%	34.4%
Not a High School Graduate	49.0%	29.4%
No Data	3.1%	1.9%
Age at Start of Kindergarten		
Age 59 Months (4 years, 11 months) and Younger	15.8%	15.0%
60-64 Months (5 years to 5 years 4 months)	41.7%	37.5%
65-69 Months (5 years, 5 months to 5 years 9 months)	38.4%	36.7%
70 Months (5 years, 10 months) and Older	4.1%	10.8%
Kindergarten Location with PFA On-Site	43.2%	25.3%
Kindergarten Location without PFA On-Site	56.8%	74.7%
Number of Students	*876*	*2,609*

Table 3: Demographics of One- and Two Year PFA Participants

	1 Year of PFA	2 Years of PFA
Female	51.0%	49.7%
English Learner	79.3%	92.7%
Free or Reduced Price Lunch	66.8%	75.2%
Ethnicity		
Latino	91.8%	96.0%
White	5.2%	1.3%
Other	3.0%	2.7%
Parent Education		
Some College	8.2%	7.3%
High School Graduate	41.3%	32.9%
Not a High School Graduate	47.3%	57.1%
No Data	3.2%	2.7%
Age at Start of Kindergarten		
Age 64 Months (5 years 4 months) and Younger	61.2%	40%
65 Months (5 years, 5 months) and Older	38.8%	60%
PFA On-Site	49.7%	46.3%
No PFA On-Site	50.4%	54.0%
Number of Students	*729*	*149*

Table 4: Linear Probability Models Examining Effects of PFA Attendance on Kindergarten Outcomes

	LALS	LAR	LAW	MATH	WSS
	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)
Attended PFA	0.009	0.031	0.000	0.045*	0.016
	(0.018)	(0.018)	(0.018)	(0.018)	(0.019)
Female	0.058**	0.059**	0.117**	0.045**	0.153**
	(0.015)	(0.015)	(0.016)	(0.015)	(0.016)
English Learner (1 and 2)	-0.348**	-0.334**	-0.218**	-0.339**	-0.132**
	(0.023)	(0.023)	(0.023)	(0.023)	(0.024)
English Learner (3)	-0.013	-0.043	-0.002	-0.057*	0.007
	(0.025)	(0.025)	(0.026)	(0.025)	(0.026)
Received Free/Reduced Price Lunch	-0.015	-0.017	-0.004	-0.007	0.001
	(0.019)	(0.019)	(0.020)	(0.019)	(0.020)
Parent did not complete high school	-0.020	-0.110**	-0.159**	-0.165**	-0.073*
	(0.027)	(0.027)	(0.028)	(0.027)	(0.028)
Parent did not complete college	-0.040	-0.113**	-0.126**	-0.129**	-0.066**
	(0.024)	(0.023)	(0.024)	(0.023)	(0.024)
Latino	-0.051	-0.034	0.025	-0.037	-0.050
	(0.028)	(0.028)	(0.029)	(0.028)	(0.029)
Other minority	-0.073*	-0.046	-0.030	-0.047	-0.090**
	(0.032)	(0.032)	(0.033)	(0.031)	(0.033)
Special Education	-0.333**	-0.261**	-0.295**	-0.221**	-0.296**
	(0.030)	(0.030)	(0.031)	(0.030)	(0.031)
Attended Kindergarten in 2008-09	-0.103**	-0.055**	-0.048*	-0.081**	-0.047*
	(0.019)	(0.019)	(0.019)	(0.018)	(0.019)
Attended Kindergarten in 2009-10	-0.109**	-0.061**	-0.079**	-0.185**	-0.048*
	(0.018)	(0.018)	(0.018)	(0.018)	(0.019)
Began Kindergarten at under 65 months	-0.054**	-0.045**	-0.071**	-0.048**	-0.075**
	(0.016)	(0.016)	(0.016)	(0.015)	(0.016)
Number of Students	3,170	3,166	3,169	3,169	3,171

Notes: (1) Regression coefficients are from one regression including the listed covariates. (2) * p <.05; **p <.01.

Table 5: Linear Probability Models Examining Effects of PFA Attendance on Kindergarten Outcomes For Specific Sub-groups

	LALS	LAR	LAW	MATH	WSS
	β	β	β	β	β
	(SE)	(SE)	(SE)	(SE)	(SE)
English Learner Level 1 or 2	0.020	0.032	0.032	0.059*	0.065*
	(0.025)	(0.025)	(0.025)	(0.024)	(0.026)
English Learner Level 3	0.011	0.052	0.006	0.074*	0.003
	(0.036)	(0.036)	(0.037)	(0.036)	(0.037)
Not English Learner	-0.018	0.004	-0.081*	-0.020	-0.082*
	(0.037)	(0.037)	(0.038)	(0.036)	(0.038)
Latino	0.015	0.039*	0.013	0.058**	0.039*
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
White or non-Latino	-0.050	-0.056	-0.130*	-0.094	-0.211**
	(0.060)	(0.059)	(0.061)	(0.058)	(0.061)
Male	0.045	0.034	-0.006	0.034	0.010
	(0.025)	(0.025)	(0.026)	(0.025)	(0.026)
Female	-0.026	0.028	0.006	0.055*	0.022
	(0.025)	(0.025)	(0.025)	(0.024)	(0.026)
Free/Reduced Price Lunch	0.015	0.043*	0.023	0.071**	0.034
	(0.022)	(0.022)	(0.022)	(0.021)	(0.022)
No Free/Reduced Price Lunch	-0.004	0.002	-0.053	-0.017	-0.025
	(0.032)	(0.032)	(0.033)	(0.032)	(0.033)
Parent Education 1	0.019	0.045	0.050	0.080**	0.066*
	(0.026)	(0.026)	(0.027)	(0.026)	(0.027)
Parent Education 2	0.029	0.053	0.000	0.034	-0.006
	(0.028)	(0.028)	(0.028)	(0.027)	(0.029)
Parent Education 3	-0.092	-0.081	-0.148*	-0.049	-0.029
	(0.060)	(0.059)	(0.060)	(0.058)	(0.061)
Special Education	0.034	0.100	0.041	0.160**	0.159**
	(0.060)	(0.060)	(0.061)	(0.059)	(0.061)
Not Special Education	0.007	0.024	-0.004	0.034	0.003
	(0.019)	(0.019)	(0.019)	(0.018)	(0.019)
Number of Students	3,170	3,166	3,169	3,169	3,171

Notes: (1) Regression coefficients are from different regression models that compare the interacted effect of PFA and each characteristic, controlling for the full set of other characteristics. (2) * p <.05; **p <.01.

Table 6: Linear Probability Models Examining Effects of PFA Attendance on First Grade Outcomes

	LALS	LAR	LAW	MATH	WSS
	β	β	β	B	β
	(SE)	(SE)	(SE)	(SE)	(SE)
Attended PFA	0.020	0.008	-0.001	0.007	0.021
	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)
Female	0.134**	0.057**	0.101**	-0.005	0.163**
	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)
English Learner (1 and 2)	-0.216**	-0.291**	-0.236**	-0.190**	-0.072*
	(0.032)	(0.032)	(0.032)	(0.032)	(0.031)
English Learner (3)	-0.057	-0.145**	-0.097**	-0.023	-0.045
	(0.035)	(0.035)	(0.035)	(0.035)	(0.034)
Received Free/Reduced Price Lunch	-0.116**	-0.104**	-0.097**	-0.169**	-0.080**
	(0.027)	(0.027)	(0.027)	(0.027)	(0.027)
Parent did not complete high school	-0.051	-0.060	-0.140**	-0.068	-0.030
	(0.038)	(0.038)	(0.038)	(0.039)	(0.038)
Parent did not complete college	-0.082*	-0.088**	-0.151**	-0.121**	-0.067*
	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)
Latino	-0.017	-0.037	-0.025	-0.090*	-0.052
	(0.039)	(0.039)	(0.039)	(0.039)	(0.039)
Other minority	-0.025	-0.007	-0.083	-0.099*	-0.103*
	(0.046)	(0.046)	(0.046)	(0.046)	(0.045)
Special Education	-0.310**	-0.262**	-0.260**	-0.235**	-0.311**
	(0.040)	(0.040)	(0.040)	(0.040)	(0.039)
Attended First Grade in 2009-10	-0.012	-0.008	-0.034	-0.022	-0.004
	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)
Began Kindergarten at under 65 months	-0.037	-0.029	-0.008	-0.041	-0.024
	(0.022)	(0.022)	(0.022)	(0.022)	(0.021)
Number of Students	*2,085*	*2,085*	*2,085*	*2,085*	*2,085*

Notes: (1) Regression coefficients are from one regression including the listed covariates. (2) * p <.05; **p <.01.

Table 7: Linear Probability Models Examining Effects of PFA Attendance on Kindergarten Outcomes For Specific Sub-groups

	LALS	LAR	LAW	MATH	WSS
	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)
English Learner Level 1 or 2	0.065	0.008	0.019	0.020	0.076*
	(0.0350	(0.035)	(0.035)	(0.035)	(0.034)
English Learner Level 3	-0.064	-0.003	-0.042	0.045	0.004
	(0.050)	(0.050)	(0.050)	(0.050)	(0.049)
Not English Learner	0.009	0.022	-0.001	-0.061	-0.082
	(0.050)	(0.050)	(0.050)	(0.051)	(0.050)
Latino	0.044	0.022	0.008	0.024	0.044
	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)
White or non-Latino	-0.218*	-0.128	-0.081	-0.160	-0.207*
	(0.082)	(0.082)	(0.082)	(0.083)	(0.081)
Male	0.039	0.023	0.006	0.044	0.030
	(0.035)	(0.035)	(0.035)	(0.035)	(0.035)
Female	0.003	-0.005	-0.007	-0.028	0.012
	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)
Free/Reduced Price Lunch	0.055	0.030	0.017	0.021	0.051
	(0.030)	(0.030)	(0.030)	(0.030)	(0.029)
No Free/Reduced Price Lunch	-0.060	-0.041	-0.042	-0.026	-0.050
	(0.045)	(0.045)	(0.045)	(0.045)	(0.045)
Parent Education 1	0.041	-0.006	0.007	0.015	0.060
	(0.036)	(0.036)	(0.036)	(0.036)	(0.036)
Parent Education 2	0.019	0.029	0.007	0.034	0.006
	(0.039)	(0.039)	(0.039)	(0.039)	(0.039)
Parent Education 2	-0.050	0.000	-0.079	-0.136	-0.057
	(0.077)	(0.078)	(0.077)	(0.078)	(0.076)
Special Education	-0.048	0.024	0.041	-0.002	-0.017
	(0.082)	(0.082)	(0.082)	(0.083)	(0.081)
Not Special Education	0.027	0.007	-0.005	0.008	0.024
	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)
Number of Students	*2,085*	*2,085*	*2,085*	*2,085*	*2,085*

Notes: (1) Regression coefficients are from different regression models that compare the interacted effect of PFA and each characteristic, controlling for the full set of other characteristics. (2) * p <.05; **p <.01.

Table 8: Linear Probability Models Examining Effects of 1 and 2 Years PFA Attendance on Kindergarten and First Grade Outcomes

	LALS	LAR	LAW	MATH	WSS
	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)
Effects of Participation on Kindergarten Outcomes					
Attended PFA 1 Year	-0.007	0.019	-0.008	0.033	0.008
	(0.019)	(0.019)	(0.02)	(0.019)	(0.020)
Attended PFA 2 Years	0.095*	0.093*	0.040	0.104*	0.060
	(0.038)	(0.038)	(0.039)	(0.038)	(0.039)
Number of Students	*3,170*	*3.166*	*3,169*	*3,169*	*3,171*
Effects of Participation on First Grade Outcomes					
Attended PFA 1 Year	0.016	0.000	-0.014	0.014	0.017
	(0.026)	(0.027)	(0.026)	(0.027)	(0.026)
Attended PFA 2 Years	0.127*	0.193**	0.144*	0.086	0.045
	(0.058)	(0.059)	(0.058)	(0.059)	(0.057)
Number of Students	*2,085*	*2,085*	*2,085*	*2,085*	*2,085*

Notes: (1) Regression models also include all covariates shown in Table 6. (2) * p <.05; **p <.01.

Table 9: Linear Probability Models Examining Effects of Attending a Community School for PFA Participants on Kindergarten and First Grade Outcomes

	LALS	LAR	LAW	MATH	WSS
	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)
Effects of Participation on Kindergarten Outcomes					
Attended a Community School	0.130**	0.106*	0.013	0.050	-0.045
	(0.034)	(0.034)	(0.35)	(0.034)	(0.034)
Number of Students	*3,170*	*3.166*	*3,169*	*3,169*	*3,171*
Effects of Participation on First Grade Outcomes					
Attended a Community School	0.044	0.058	0.064	0.074	0.086
	(0.046)	(0.046)	(0.044)	(0.046)	(0.045)
Number of Students	*2,085*	*2,085*	*2,085*	*2,085*	*2,085*

Notes: (1) Regression models also include all covariates shown in Table 6. (2) * p <.05; **p <.01.