



**ALBUQUERQUE  
PUBLIC SCHOOLS**

# **A Summative Evaluation of the First Year of the K-3 Plus Program**

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March 2009



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# *EVALUATION REPORT*

NANCY CARRILLO

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## **A SUMMATIVE EVALUATION OF THE FIRST YEAR OF THE K-3 PLUS PROGRAM**

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### *Executive Summary*

The NM Public Education Department offers funds to qualifying schools for an extra 25 days of instruction for volunteer students through the K-3 Plus Program. In Albuquerque, sixteen schools participated in K-3 Plus in the 2007-08 SY. This report is a summative evaluation of the first year of the program, and will answer the following evaluation questions:

1. Does the K-3 Plus program encourage families to remain in the same school?
2. How do academic outcomes compare for K-3 Plus students and their peers?
  - a. Does K-3 Plus reduce summer loss of reading skills?
  - b. Does any advantage of K-3 Plus persist to the middle of the school year?
  - c. Does any advantage of K-3 Plus persist to the end of the school year?
3. What factors are connected with more successful K-3 Plus program sites?

We developed a quantitative, student-level data set comprised of all students in grades and schools served by K-3 Plus. The treatment group consists of the 978 students who participated in K-3 Plus for any length of time. The comparison or peer group consists of the 4,586 students enrolled in K-3 Plus schools and grades during the spring of the 2006-07 SY or anytime during the 2007-08 SY.

We collected outcome assessment information for the three benchmark test windows of the 2007-08 SY. For kindergartners, we collected Kindergarten Developmental Progress Report (KDPR) math and reading scores. For 1<sup>st</sup> and 2<sup>nd</sup> grade students, we collected Developmental Reading Assessment 2 (DRA) scores. For 3<sup>rd</sup> graders, we collected DRA or A2L reading scores for students, depending on the school's practice. We also collected A2L math scores for 3<sup>rd</sup> graders.

We consider five implementation factors that may impact K-3 Plus success: the number of grades that the school site serves; the number of K-3 Plus classes within the school; the amount of K-3 Plus time that is front-loaded before the regular 2007-08 SY; the number of years of experience with K-3 Plus for each school; and the extent to which schools keep K-3 Plus students with their K-3 Plus teacher once the regular school year begins.

### **1. Does the K-3 Plus program encourage families to remain in the same school?**

To examine this question, we limit our analysis to 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> grade students who were enrolled at the same K-3 Plus school in spring and fall 2007. We then compare the percentage of K-3 Plus students and their peers in grades 1 through 3 who remained in the same school during the entire 2007-08 school year. Overall, 93% of K-3 Plus students remained in the same school

compared to 92% of peer students. There is little to suggest that K-3 Plus encourages school stability.

**2. How do academic outcomes compare for K-3 Plus students and their peers?**

For the most part and not surprisingly, the impact of K-3 Plus is seen most strongly in the fall benchmark administration, directly following the program. After controlling for demographic factors (ELL status, special education status, gender, and ethnicity), K-3 Plus kindergarten students earn on average two more points in reading and four more points in math on the fall KDPR. After controlling for past achievement and demographic factors, both 2<sup>nd</sup> and 3<sup>rd</sup> grade students score about one reading level higher on the fall DRA. However, 1<sup>st</sup> grade K-3 Plus students score no higher than their peers on the fall DRA; likewise, 3<sup>rd</sup> grade K-3 Plus students and their peers earn similar fall A2L scores in both math and reading.

Winter assessment comparisons provide a much harder test of the K-3 Plus program because by this time non-participating students have likely been exposed to the same instruction received by K-3 Plus participants during the summer. There is little to suggest that K-3 Plus improves winter reading or math scores for kindergarteners or 1<sup>st</sup> graders, nor 3<sup>rd</sup> graders’ A2L scores in reading or math. Yet for both 2<sup>nd</sup> and 3<sup>rd</sup> grade, K-3 Plus students earn a statistically significantly higher score of a little less than one reading level above their peers on the DRA.

By spring, only one analysis detects a continuing impact of K-3 Plus. DRA scores for 2<sup>nd</sup> grade K-3 Plus students are higher than their peers’ scores by about half a reading level. All other assessment comparisons fail to detect a difference between K-3 Plus students and their peers. Results for all three benchmark windows are summarized below.

**Summary of the Evidence: Statistically Significant Differences between K-3 Plus Students and Peers**

	Fall 2007	Winter 2008	Spring 2008
Kindergarten Reading	Yes ( 2pts)	No	No
Kindergarten Math	Yes (4 pts)	No	No
1 <sup>st</sup> Grade Reading	No	No	No
2 <sup>nd</sup> Grade Reading	Yes (1 level)	Yes (.7 level)	Yes (.6 level)
3 <sup>rd</sup> Grade Reading (DRA)	Yes (1 level)	Yes (.7 level)	No
3 <sup>rd</sup> Grade Reading (A2L)	No	No	No
3 <sup>rd</sup> Grade Math	No	No	No

The amounts of difference between K-3 Plus students and peers are noted in parentheses.

**3. What factors are connected with more successful K-3 Plus program sites?**

While overall, K-3 Plus does not seem to improve school stability and improvements in academic achievement are mixed; the variation in schools’ levels of success suggest implementation factors that may be important for both outcomes. Large programs and front-loading most or all extra days to before the regular school year begins seems to benefit both stability and kindergarteners’ academic achievement. On the other hand, K-3 Plus seems to have

more impact on older students' academic achievement when K-3 Plus days are spread out throughout the year and when they remain with the same teacher when the regular school year begins.

This study's findings may not be generalizable due especially to the few number of schools and years of implementation included. There are also threats to the study's validity, or level of confidence we can have in the findings. Especially important factors are selection bias due to non-random assignment; broad measures of academic achievement; and lack of attendance information.

Including attendance information and classroom implementation factors may improve the usefulness of future evaluations. To the extent possible, schools should ensure students stay with their K-3 Plus teachers and try to implement a large program.

# EVALUATION REPORT

NANCY CARRILLO

MARCH 2009

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## A SUMMATIVE EVALUATION OF THE FIRST YEAR OF THE K-3 PLUS PROGRAM

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### *Introduction*

The NM Public Education Department offers funds to qualifying schools for an extra 25 days of instruction for volunteer students through the K-3 Plus Program (2007 NM House Bill 198). In Albuquerque, sixteen schools participated in K-3 Plus in the 2007-08 SY, including: Alamosa, Dolores Gonzales, Duranes, Edward Gonzales, Emerson, Eubank, Hawthorne, Kirtland, Lavaland, La Luz, La Mesa, Los Padillas, Mountain View, Reginald Chavez, Valle Vista, and Whittier. The program includes 22 kindergarten classrooms, eighteen 1<sup>st</sup> grade classrooms, fourteen 2<sup>nd</sup> grade classrooms, one 1<sup>st</sup>-2<sup>nd</sup> grade combination class, and fifteen 3<sup>rd</sup> grade classrooms. A total of 978 students participated: 330 kindergartners, 242 1<sup>st</sup> graders, 202 2<sup>nd</sup> graders, and 204 3<sup>rd</sup> graders.

This is the second of two reports detailing the results of an evaluation of the first year of the K-3 Plus Program (2007-08). The first report provides descriptive and background information about the K-3 Plus program. Its findings suggest that K-3 Plus does seem to attract students in need of extra instruction. Teachers reported feeling they have more instructional time during K-3 Plus days compared with regular school days, most of which they spent on language arts and math instruction. They expressed high job satisfaction with K-3 Plus and identified small class size and opportunity for flexible curricula as key strengths of the program. From their perspective, challenges include transitioning to the regular school year, variation in student abilities, low attendance, and teacher and student burn-out.<sup>1</sup>

This report is a summative evaluation of the first year of the program, and will answer the following evaluation questions:

1. Does the K-3 Plus program encourage families to remain in the same school?
2. How do academic outcomes compare for K-3 Plus students and their peers?
  - a. Does K-3 Plus reduce summer loss of reading skills?
  - b. Does any advantage of K-3 Plus persist to the middle of the school year?
  - c. Does any advantage of K-3 Plus persist to the end of the school year?
3. What factors are associated with more successful K-3 Plus program sites?

### *Method*

*Student Sample.* We developed a quantitative, student-level data set comprised of all students in grades and schools served by K-3 Plus. The treatment group consists of the 978 students who

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<sup>1</sup> Carrillo, N. 2008. A Formative Evaluation of the K-3 Plus Program. Albuquerque Public Schools. [http://www.rda.aps.edu/RDA/Documents/Publications/07\\_08/K-3\\_Plus\\_Formative\\_Evaluation\\_I.pdf](http://www.rda.aps.edu/RDA/Documents/Publications/07_08/K-3_Plus_Formative_Evaluation_I.pdf).

participated in K-3 Plus for any length of time. The comparison or peer group consists of the 4,586 students enrolled in K-3 Plus schools and grades during the spring of the 2006-07 SY or anytime during the 2007-08 SY.<sup>2</sup> For grades 1 through 3, however, many analyses are limited to the 549 (85%) K-3 Plus students and 2,021 (61%) peer group students who were enrolled at the same K-3 Plus school before the intervention began (spring 2007) and directly following it (fall 2007).

*Assessment variables.* We collected assessment information for the three benchmark test windows (fall, winter, and spring) of the 2007-08 SY. For kindergartners, we collected Kindergarten Developmental Progress Report (KDPR) math and reading scores. For 1<sup>st</sup> and 2<sup>nd</sup> grade students, we collected Developmental Reading Assessment 2 (DRA)<sup>3</sup> scores. For 3<sup>rd</sup> graders, we collected A2L reading scores for students in eight schools and DRA scores for students in nine schools. And for all 3<sup>rd</sup> graders, we collected A2L math scores.<sup>4</sup>

For 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> grade students, we collected assessment information from the spring preceding the K-3 Plus program. For 1<sup>st</sup> grade students, these are KDPR reading scores. For 2<sup>nd</sup> and 3<sup>rd</sup> grade students, we collected DRA scores.

KDPR reading scores start at 0 and cap at 40, 24, 33, and 33, respectively, for spring 2007, fall 2007, winter 2008 and spring 2008. Similarly, KDPR math scores start at 0 and cap at 36, 33 and 42, respectively, for spring and fall 2007, and spring 2008.<sup>5</sup> The DRA assessments determine the independent reading level for each child; these levels are recoded to an ordinal scale ranging from 0 to 18. Finally, A2L assessments are matched to grade-level standards. A2L scores represent the percentage of items answered correctly.

Some analyses examine reading or math proficiency, a dichotomous measure. For the purposes of this report, reading proficiency is defined as follows: for kindergarten students, KDPR scores of (at least) 18, 20, and 22, respectively, in the fall, winter, and spring of 2007-08; for 1<sup>st</sup> graders, a spring 2006-07 KDPR reading score of 32, and DRA reading levels of 2, 4, and 8 in the fall, winter, and spring of 2007-08; for 2<sup>nd</sup> graders, a spring 2006-07 DRA reading level of 12, and DRA reading levels of 12, 16, and 18 in the fall, winter and spring of 2007-08; and for 3<sup>rd</sup> graders, a spring 2006-07 DRA reading level of 20, and either DRA reading levels of 20, 28, and 30, or A2L reading scores of 41, 51, and 61 in the fall, winter, and spring of 2007-08. Math proficiency is defined as: for kindergarten students, KDPR scores of at least 25 and 34,

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<sup>2</sup> By grade: 1,272 kindergartners, 1,148 1<sup>st</sup> graders, 1,077 2<sup>nd</sup> graders, and 1,089 3<sup>rd</sup> graders.

<sup>3</sup> We also include the Spanish version of the DRA, the Evaluación Del Desarrollo De La Lectura 2. Since the two assessments are equivalent, results are combined throughout the analysis. We use the results from the assessment with the highest scores for students with scores on both assessments.

<sup>4</sup> DIBELS is required by state law for all K-3 Plus students three times each year. The use of this information for evaluation purposes is stymied, however, as no comparison group of 1<sup>st</sup>, 2<sup>nd</sup>, or 3<sup>rd</sup> grade students use DIBELS in APS. While all kindergarten students do take DIBELS, during the 2007-08 SY this information was collected in multiple ways and was deemed too costly and difficult to collect.

<sup>5</sup> KDPR math scores for the winter window of the 2008 SY are omitted due to inconsistencies in reporting practices and cut scores.

respectively, in the fall and spring of 2007-08; and for 3<sup>rd</sup> graders, A2L math scores of 41, 51, and 61 in the fall, winter, and spring of 2007-08.<sup>6</sup>

*Control variables.* Four demographic variables known to affect academic outcomes are included in this analysis: gender, special education status (not including gifted), ELL (English Language Learner) status, and underperforming minority ethnicity (Hispanic, Native American or Black).<sup>7</sup> Each is a binomial measure. When possible, we also control for previous achievement using spring 2007 reading assessment scores.

*School-level program implementation factors.* We consider five implementation factors that may impact K-3 Plus success. The first are the grades that the school site serves. Most schools offer K-3 for all four grades, but a few limit the program to one, two, or three grades. The second factor is the number of K-3 Plus classes within the school. The number of classes ranges from one to nine. Third, we consider the amount of K-3 Plus time that is front-loaded before the regular 2007-08 SY begins. The number of weeks of K-3 Plus before the regular school year ranges from three to five, as some schools' schedules necessitated that some K-3 Plus days take place during or following the regular school year. The fourth school-level factor we examine is the number of years of experience with K-3 Plus each school has.<sup>8</sup> In this dataset, most schools are participating for the first time; but six schools have between two and five years of experience. And finally, we examine the extent to which schools keep K-3 Plus students with their K-3 Plus teacher once the regular school year begins. In all schools and grades, some K-3 Plus students move to other classrooms for a variety of reasons, for example to be in a bilingual classroom. And inevitably, non K-3 Plus students are added to teachers' rosters. In most schools, K-3 Plus classrooms stayed intact for the most part. In a few schools, one or more K-3 Plus teachers left the grade level or the school when the regular school year began.

*Analyses.* We use independent t-tests, OLS multiple regression, and logit analyses in this study to try to detect substantive and/or statistically significant differences between K-3 students and their peers. When discerning whether any school-level implementation factors impact outcomes, we look for general patterns since the number of schools is too small for statistical analysis.

## ***Results***

### **1. Does the K-3 Plus program encourage families to remain in the same school?**

One possible benefit of the K-3 Plus program is that families may be encouraged to stay in the same school to take advantage of the program. Research links school stability to higher academic achievement, grade retention, graduation rates, and social/emotional success. Additionally, high

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<sup>6</sup> Because teachers have some discretion, these cut scores do not always correspond with students' teacher-described proficiency levels, but are used instead since teacher-described proficiency levels are missing for many students in this data set.

<sup>7</sup> Socio-economic level is another demographic variable known to affect academic achievement. In APS, our best indicator of socio-economic level is participation in the Free/Reduced Price Lunch Program (FRLP). Nearly all students in these schools qualify for FRLP. Since FRLP is a constant in this dataset, we cannot analyze its impact.

<sup>8</sup> The similar predecessor program, K-Plus, added 40 extra days to participating kindergarteners' school year.

instability consumes staff and faculty time and may adversely impact stable students' academic progress by slowing instruction.<sup>9</sup>

To examine this question, we limit our analysis to 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> grade students who were enrolled at the same K-3 Plus school in spring and fall 2007 in order to eliminate students who had moved into or away from school boundaries during the summer. We then compare the percentage of K-3 Plus students and their peers who remained in the same school during the entire 2007-08 school year. As seen in Table 1, virtually no difference occurs in any grade. Overall, 93% of K-3 Plus students remained in the same school compared to 92% of peer students. Thus, there is little to suggest that K-3 Plus encourages school stability.<sup>10</sup>

**Table 1: Stability Differences between K-3 Plus Families and Peer Families by Grade and by School**

	K-3 Plus Students		Peers		Difference	T
	N	%	N	%		
<b>Overall</b>	<b>549</b>	<b>93%</b>	<b>1,780</b>	<b>92%</b>	<b>.01</b>	<b>.19</b>
<i>By Grade</i>						
1 <sup>st</sup> Grade	194	93%	510	91%	.02	.91
2 <sup>nd</sup> Grade	180	90%	612	93%	-.03	1.07
3 <sup>rd</sup> Grade	175	95%	658	93%	.02	.74

## 2. How do academic outcomes compare for K-3 Plus students and their peers?

### a. Does K-3 Plus reduce summer loss of reading skills?

A possible advantage of K-3 Plus is preventing students from losing the skills and knowledge they learned in school over the long summer break. Table 2 represents a series of multiple regression analyses which assess the impact of K-3 participation on reading scores in Fall 2007 for kindergarten through 3<sup>rd</sup> grade. For 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> graders, we limit our analyses to students who were enrolled at the same K-3 Plus school site in the spring and fall of 2007. We control for important demographic variables and past performance when possible. The results for control

<sup>9</sup> Three examples of supporting research, among many, are: Ingersoll, G. M., Scamman, J. P., & Eckerling, W. D. (1989). "Geographic mobility and student achievement in an urban setting." *Educational Evaluation and Policy Analysis 11*, 143-149; Mao, M. X., Whitsett, M. D., & Mellor, L. T. (1998). "Student mobility, academic performance, and school accountability." *ERS Spectrum, Winter*, 3-15; and U.S. General Accounting Office. (1994). *Elementary school children: Many change schools frequently, harming their education*. Washington, DC: United States General Accounting Office: <http://archive.gao.gov/t2pbat4/150724.pdf>.

<sup>10</sup> K-3 Plus may have been a consideration for some families thinking of transferring to another school or moving to a home within a different school's boundaries at the end of the 2006-07 SY, a possibility that is not reflected in these analyses since only students that are enrolled both in the spring and fall of 2007 are included. These analyses may therefore *underestimate* the impact of K-3 Plus on stability. When one includes all students who were enrolled in the spring of 2007 at the K-3 Plus site, regardless of where they attended school the following fall, stability is much higher for K-3 Plus participants compared to non-participants. Of course, families who know they will be moving over the summer are unlikely to enroll their children in K-3 Plus. So considering all students enrolled in K-3 Plus schools in the spring of 2007 would certainly be an *overestimation* of the impact of K-3 Plus on stability.

variables are omitted here: you can find complete regression results for Tables 2 through 7 in Appendix A.<sup>11,12</sup>

**Table 2: Regressing K-3 Participation on Fall 2007 Reading Scores by Grade and Assessment**

	Kindergarten	1 <sup>st</sup> Grade	2 <sup>nd</sup> Grade	3 <sup>rd</sup> Grade	
Assessment:	KDPR	DRA	DRA	DRA	A2L
School <i>n</i>	16	11	12	8	9
Student <i>n</i>	1398	640	769	392	407
<b>K-3 Participation</b>	<b>2.35*</b> <b>(.59)</b>	<b>.40</b> <b>(.31)</b>	<b>.97*</b> <b>(.27)</b>	<b>1.06*</b> <b>(.17)</b>	<b>.41</b> <b>(1.87)</b>

\*p<.05. Standard errors indicated in parentheses. Results for socio-economic and past performance factors omitted.

In three of the five analyses, K-3 Plus has a positive and statistically significant improvement on fall reading scores. On average, K-3 Plus students earned over two points more than non-participants on the KDPR reading test, a substantial amount on a 24-point test. And K-3 Plus raised DRA reading levels by approximately one level for both 2<sup>nd</sup> and 3<sup>rd</sup> graders. On the other hand, K-3 Plus does not improve 1<sup>st</sup> graders' DRA scores nor 3<sup>rd</sup> graders' A2L scores statistically significantly.

Turning our attention now to math, Table 3 examines the impact of K-3 Plus participation on fall assessment scores. We have information available for kindergarten (KDPR math) and 3<sup>rd</sup> grade (A2L) only. Unfortunately, in neither case can we control for previous achievement. The impact of K-3 Plus on KDPR math scores is quite high, increasing scores almost four points on a 33-point scale. But as with reading, K-3 Plus has no impact on 3<sup>rd</sup> grade A2L scores.

**Table 3: Regressing K-3 Participation on Fall 2007 Math Scores, K and 3<sup>rd</sup> Grade**

	Kindergarten	3 <sup>rd</sup> Grade
Assessment:	KDPR	A2L Math
School <i>n</i>	16	12
Student <i>n</i>	1,398	802
<b>K-3 Participation</b>	<b>3.91*</b> <b>(1.05)</b>	<b>.47</b> <b>(1.55)</b>

\*p<.05. Standard errors indicated in parentheses. Results for socio-economic and past performance factors omitted.

Overall, these results are mixed but suggestive regarding the impact of K-3 Plus on students' fall assessment scores. Most of the evidence indicates that K-3 Plus students gain more reading skills between spring 2007 and fall 2007 compared to their peers. Tables 2 and 3 show that K-3 Plus may have particularly important effects for kindergarten students. On the other hand, there is

<sup>11</sup> Some intervention programs have differing effects on reading proficiency depending on students' prior abilities. In analyses not shown here, we ran all multiple regression analyses in Tables 2, 4, and 6 separately for students proficient and not proficient the previous spring for grades 1 through 3. In no case does K-3 Plus impact proficient and non-proficient students differently once socio-demographic factors and past performance are controlled; thus, we combine all students in these analyses. Complete results available by request.

<sup>12</sup> All regression and logit analyses involving multiple schools are clustered by school.

little to suggest that K-3 Plus participation mattered for 1<sup>st</sup> grade DRA scores or 3<sup>rd</sup> grade A2L scores in either math or reading.

**b. Does any advantage of K-3 Plus persist to the middle of the school year?**

Winter assessments are usually administered between mid-January and mid-February. By this time, all students have received approximately five months of instruction; K-3 Plus students have received three to five more weeks of instruction. Winter assessment comparisons provide a much harder test of the K-3 Plus program, of course, because by this time non-participating students likely have been exposed to the same instruction received by K-3 Plus participants during the summer. In the need to accommodate non-participating students in their classes and, in some cases, to comply with grade-level pacing guides in their schools, K-3 Plus teachers may not have much opportunity to capitalize on the additional knowledge and skills their K-3 Plus students gained during the summer intervention.

In Table 4, we regress K-3 Plus participation on winter reading scores for all grades. In just two of the five analyses, K-3 Plus students earn statistically significantly higher scores than their peers once demographic variables are controlled. For both 2<sup>nd</sup> and 3<sup>rd</sup> grade, K-3 Plus students score a little less than one reading level above their peers after controlling for demographic scores and their spring 2007 DRA score, somewhat less than in the fall. Kindergarten K-3 Plus students also earn higher reading scores than their peers, but not quite to a statistically significant degree. There is little to suggest that K-3 Plus improves winter reading scores for either 1<sup>st</sup> graders or 3<sup>rd</sup> graders assessed with A2L.

**Table 4: Regressing K-3 Participation on Winter 2008 Reading Scores by Grade and Assessment**

	Kindergarten	1 <sup>st</sup> Grade	2 <sup>nd</sup> Grade	3 <sup>rd</sup> Grade	
Assessment:	KDPR	DRA	DRA	DRA	A2L
School <i>n</i>	15	13	13	9	10
Student <i>n</i>	1,298	771	857	475	437
<b>K-3 Participation</b>	<b>1.02</b> <b>(.61)</b>	<b>-.05</b> <b>(.34)</b>	<b>.71*</b> <b>(.23)</b>	<b>.70*</b> <b>(.24)</b>	<b>-.70</b> <b>(1.70)</b>

\*p<.05. Standard errors indicated in parentheses. Results for socio-economic and past performance factors omitted.

Table 5 examines the impact of K3 Plus participation on fall math assessment scores for kindergarten and 3<sup>rd</sup> grade. This time, in neither case do K-3 Plus participants score better than their peers after controlling for demographic factors.

Winter assessment results suggest that it may be difficult to maintain students’ relative advantage to their peers beyond a few months time. Given that the K-3 Plus program requests teachers to cover the same material as they do during the regular school year, K-3 Plus students perhaps learn material somewhat earlier than their peers, but teachers may not be able to capitalize on this gain as they have to repeat the work again when the regular school year starts. Relatively soon, in most cases non-participants’ achievement becomes equivalent with K-3 Plus students’ achievement. Importantly, there are two exceptions – 2<sup>nd</sup> and 3<sup>rd</sup> grade A2L reading scores.

**Table 5: Regressing K-3 Participation on Winter 2008 Math Scores, K and 3<sup>rd</sup> Grade**

	Kindergarten	3 <sup>rd</sup> Grade
Assessment:	KDPR	A2L Math
School <i>n</i>	15	13
Student <i>n</i>	1,298	967
<b>K-3 Participation</b>	<b>.91</b> <b>(2.06)</b>	<b>-.78</b> <b>(1.82)</b>

\*p<.05. Standard errors indicated in parentheses. Results for socio-economic and past performance factors omitted.

**c. Does any advantage of K-3 Plus persist to the end of the school year?**

Spring assessments are usually administered in April. By this time, all students have received approximately seven to eight months of instruction; K-3 Plus students have received four to five weeks more. Spring assessment comparisons provide a very hard test of the K-3 Plus program since non-participants have had so much time to catch up to K-3 Plus students.

In Table 6, we regress K-3 Plus participation on spring reading scores for all grades. In only one of the five analyses, K-3 Plus students earn statistically significantly higher scores than their peers once demographic variables are controlled; 2<sup>nd</sup> grade K-3 Plus students score about one half of a reading level higher on DRA than their peers. Again, kindergarten K-3 Plus students also earn higher reading scores than their peers, but not to a statistically significant degree. K-3 Plus does not improve spring reading scores for either 1<sup>st</sup> graders or 3<sup>rd</sup> graders.

**Table 6: Regressing K-3 Participation on Spring 2008 Reading Scores by Grade and Assessment**

	Kindergarten	1 <sup>st</sup> Grade	2 <sup>nd</sup> Grade	3 <sup>rd</sup> Grade	
Assessment:	KDPR	DRA	DRA	DRA	A2L
School <i>n</i>	15	12	12	9	9
Student <i>n</i>	1,272	757	830	471	424
<b>K-3 Participation</b>	<b>1.11</b> <b>(.70)</b>	<b>-.07</b> <b>(.34)</b>	<b>.57*</b> <b>(.23)</b>	<b>-.26</b> <b>(.29)</b>	<b>.83</b> <b>(1.07)</b>

\*p<.05. Standard errors indicated in parentheses. Results for socio-economic and past performance factors omitted.

Finally, Table 7 examines the impact of K3 Plus participation on spring math assessment scores for kindergarten and 3<sup>rd</sup> grade. As was true for the winter testing window, in neither case do K-3 Plus participants score statistically significantly better than their peers after controlling for demographic factors, though the coefficient for kindergarten approaches significance.

**Table 7: Regressing K-3 Participation on Spring 2008 Math Scores, K and 3<sup>rd</sup> Grade**

	Kindergarten	3 <sup>rd</sup> Grade
Assessment:	KDPR	A2L Math
School <i>n</i>	15	13
Student <i>n</i>	1,272	946
<b>K-3 Participation</b>	<b>1.41</b> <b>(.78)</b>	<b>1.03</b> <b>(2.54)</b>

\*p<.05. Standard errors indicated in parentheses. Results for socio-economic and past performance factors omitted.

In summary, as seen in Table 8, when controlling for past performance and demographic factors, the impact of K-3 Plus is strongest in the fall directly following the K-3 Plus intervention, but even then is not always apparent. The impact of K-3 Plus tends to diminish over time. The relatively consistent, positive impact of K-3 Plus on 2<sup>nd</sup> grade reading is a notable exception.

**Table 8: Summary of the Evidence: Statistically Significant Differences between K-3 Plus Students and Peers**

	Fall 2007	Winter 2008	Spring 2008
Kindergarten Reading	Yes ( 2pts)	No	No
Kindergarten Math	Yes (4 pts)	No	No
1 <sup>st</sup> Grade Reading	No	No	No
2 <sup>nd</sup> Grade Reading	Yes (1 level)	Yes (.7 level)	Yes (.6 level)
3 <sup>rd</sup> Grade Reading (DRA)	Yes (1 level)	Yes (.7 level)	No
3 <sup>rd</sup> Grade Reading (A2L)	No	No	No
3 <sup>rd</sup> Grade Math	No	No	No

The amounts of difference between K-3 Plus students and peers are noted in parentheses.

### **3. What factors are connected with more successful K-3 Plus program sites?**

Thus far, we have learned that overall K-3 Plus does not seem to improve school stability. It does improve students' math and reading achievement in some cases, particularly on fall assessments. There are variations in schools' levels of success for both improving stability and improving academic achievement through the K-3 Plus program, though; and we may be able to learn something about school factors that impact K-3 Plus success.

We assess the possible effects of five school-level program implementation factors on the success of K-3 Plus in schools. Both the number of grades and the number of classes within the school measure the size of the program. Larger programs may allow streamlined marketing and logistics through shared resources. Also, they may offer more opportunities for teacher collaboration which could improve instruction. Another factor we examine is the amount of K-3 Plus time that is front-loaded in the summer. Anecdotally, schools report attendance in the program is higher before the regular school year starts compared to other times; and some stakeholders have speculated that program days before the school year starts are more important to the program's success than days during or after the regular school year. On the other hand, spreading out the extra days may allow K-3 Plus teachers to provide individualized instruction and address participants' gaps in understanding as they become more apparent during the regular school year. We also consider the number of years of experience with K-Plus and K-3 Plus each school has. It may be that schools with more experience will have learned and tailored processes such that they can focus more on instruction compared to other sites. Finally, we examine the extent to which schools keep K-3 Plus students with their K-3 Plus teacher once the regular school year begins. Breaks in social relationships and/or instruction may adversely affect the program's success.

Importantly, these results can only be suggestive and should be considered preliminary. Given the few number of participating schools, the fact that the program is in its first year for most schools and grades, and the low variance in some program implementation factors, we should

use caution in our examination of these school-level factors. We are merely looking for patterns.

*Stability.* As we have seen, overall, K-3 Plus does not seem to improve the likelihood that students will remain in the same school. When we repeat the analysis by school, we find four schools (I-IV) in which K-3 Plus students are more likely to remain at the same school for the entire year following the K-3 Plus intervention compared to their peers, two statistically significantly so.<sup>13,14</sup> Table 9 displays stability rates for K-3 Plus students and their peers for each school along with the school's implementation factors. (See Appendix B for more detail regarding the t-tests reported in Table 9.)

**Table 9: Stability and School-level Factors**

School	Stability Rates of K-3 Plus and Peer Families			Grades	Classes	K-3 Plus summer weeks	Experience	Consistent Teacher
	K-3 Plus	Peers	Diff.					
I	93%	84%	9	1-3	4	4	2	None
II	98%	91%	7*	K-3	7	5	1	All
III	100%	94%	6*	K-3	7	5	1	All
IV	98%	93%	5	K-3	4	5	5	All but 1 <sup>st</sup>
V	92%	92%	0	K-3	9	3	4	K only
VI	94%	95%	-1	K-3	5	3	1	All
VII	92%	94%	-2	K, 2, 3	3	3	1	All
VIII	83%	86%	-3	K-3	5	3	5	All
IX	90%	94%	-4	K-3	6	3	1	All
X	92%	97%	-5	K-3	4	5	1	K only
XI	84%	90%	-6	K-3	4	3	1	All but 3 <sup>rd</sup>
XII	88%	94%	-6	K-3	6	5	2	All
<b>Average</b>	<b>93%</b>	<b>92%</b>	<b>1</b>	<b>K-3</b>	<b>4</b>	<b>4</b>	<b>2</b>	<b>All</b>

\*p<.05, independent t-tests. Shading represents successful schools.

In only four of the twelve schools, the stability rates for K-3 Plus families are notably higher than for peer families; in only two cases are the differences statistically significant. No school-level factor seems to be strongly connected with this success; but the data do suggest two implementation factors which may help. First, all four successful schools have relatively large K-3 Plus programs – at least four classes or more, though many less successful schools also host a large number of classes. All four schools front-loaded the program so that most or all of it takes place before the regular school year starts, as designed. All four successful schools' schedules allow at least four weeks of K-3 Plus to occur before the regular school year begins. Again, a few other schools front-load their programs as well, but many more only hold three weeks of K-3 Plus before the regular school year begins. Neither a school's level of experience with the K-3 Plus program nor the extent to which it keeps K-3 Plus students with the same teacher appear to impact the ability of K-3 Plus to improve stability.

<sup>13</sup> Schools' identities are protected in Tables 9-12. School I in Table 9 is not necessarily the same school as School 1 in Table 10 or School A in Table 11 or 12.

<sup>14</sup> Three schools are omitted because they do not serve students other than Kindergarteners; one more school is omitted because the low numbers of families make a t-test inappropriate.

*Academic achievement.* We turn our attention now to academic achievement, looking first at changes in reading proficiency for 1<sup>st</sup> through 3<sup>rd</sup> grade students. Table 10 reports logit analyses that compare the percentage of 1<sup>st</sup> through 3<sup>rd</sup> grade K-3 Plus and peer students who were proficient in reading in the fall while controlling for past performance and socio-demographic variables.<sup>15, 16</sup> (See Appendix C for more detail regarding the logit analyses).

**Table 10: Impact of K-3 Plus on Fall Reading Proficiency for Grades 1-3 by School**

School	Logit Coefficient for K-3 Plus	Grades	Classes	K-3 Plus summer weeks	Experience	Consistent Teacher in 1 <sup>st</sup> -3 <sup>rd</sup> grades
1	1.98*	K-3	4	3	1	All but 3 <sup>rd</sup>
2	1.80	K-1	2	3	1	Yes
3	1.22	K-3	5	3	5	Yes
4	1.10*	K-3	5	3	1	Yes
5	.57	K-3	6	5	2	Yes
6	.53	K-3	7	5	1	Yes
7	.51	K, 2, 3	3	3	1	Yes
8	.50	K-3	4	5	5	All but 1 <sup>st</sup>
9	.38	K-3	4	5	1	No
10	.27	K-3	9	3	4	No
11	-.03	1-3	4	4	2	No
12	-.12	K-3	6	3	1	Yes
13	-.16	K-3	7	5	1	Yes
<b>Overall</b>	<b>1.19</b>	<b>K-3</b>	<b>4</b>	<b>4</b>	<b>2</b>	<b>Yes</b>

\*p<.05 in logit analyses. Past reading proficiency, ELL status, special education status, underperforming ethnic minority status, and gender are controlled. Shading represents particularly successful schools.

There are four schools (1-4) whose K-3 Plus program has a sizable impact on reading proficiency. One factor that seems to differentiate successful schools from all others is the *low* number of K-3 Plus weeks that take place preceding the regular school year. This may imply that only a few extra weeks of instruction boosts student abilities, beyond which there may be a diminishing rate of return. In the four successful schools, most K-3 Plus students stay with their K-3 Plus teacher when the regular school year starts, though this is not true for 3<sup>rd</sup> graders in School 1. However, most K-3 Plus students stay with their K-3 Plus teacher in the majority of the less successful schools as well. There are no apparent trends between K-3 Plus' impact on reading proficiency and schools' experience with the program or the program's size. Thus, is it

<sup>15</sup> Logit analyses are used because the dependent variable, proficiency, is dichotomous. Because we combine grades (1<sup>st</sup> through 3<sup>rd</sup>) in order to increase *n* for school-level analyses, we are prevented from using more precise raw scores as the dependent variable since different grades use different reading assessments.

<sup>16</sup> Only fall reading scores are examined, because in no school are there statistically significant differences between K-3 Plus students' and peers' reading proficiency rates for either the winter or spring 2008 benchmark. We also tried examining the impact of K-3 Plus on 3<sup>rd</sup> grade math scores controlling for socio-economic factors (but with no past performance information available). In only one instance does K-3 Plus have a statistically significant positive impact on math scores – in one school in the spring. Such findings offer little value. Complete results available by request.

difficult to conclude much about how these implementation factors may impact academic achievement for 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> graders.

In Tables 11 and 12, we examine the impact of K-3 Plus on kindergartners' reading and math scores by school. Table 11 refers to reading. The first three columns are the coefficients for K-3 Plus in regression analyses when controlling for socio-economic factors for the 2007-08 fall, winter, and spring KDPR assessments. They are the average number of points K-3 Plus students earn above their peers' average raw score. In eight of fifteen schools (A-H), K-3 Plus students earned on average at least 1.7 points more on the KDPR reading assessment in the fall compared to their peers after controlling for socio-economic factors; and in seven of these schools the difference is statistically significant. In the winter, in only four schools do K-3 Plus students earn at least that much more than their peers, and in only one case is the difference statistically significant. In the spring, seven schools' K-3 Plus students earn at least 1.7 more points than their peers; in two schools the differences are statistically significantly different. (See Appendix D for more detail regarding the regression analyses in Table 11.)

**Table 11: Impact of K-3 Plus on KDPR Reading Scores for Kindergarteners**

School	OLS Regressions			Grades	Classes	K-3 Plus summer weeks	Experience	Consistent Teacher for K
	Fall Coeff.	Winter Coeff.	Spring Coeff.					
A	4.97*	3.27*	4.35*	K-3	6	5	2	Yes
B	4.67*	-1.28	.89	K-3	7	5	1	Yes
C	4.15*	-1.40	2.35	K-3	6	3	1	Yes
D	3.18*	-2.15	1.49	K-3	4	5	5	Yes
E	2.89*	1.58	4.38*	K	1	3	1	Yes
F	2.03*	-.58	-3.08	K	1	4	1	Yes
G	1.98	2.54	2.39	K-3	4	5	1	Yes
H	1.78*	1.96	1.09	K-3	9	3	4	Yes
I	1.69	1.25	2.26	K-3	4	3	1	Yes
J	1.47	1.46	1.82	K-1	2	3	1	Yes
K	1.28	.23	-1.46	K	2	5	5	Yes
L	.44	.95	2.73	K-3	5	3	5	Yes
M	.43	2.20	-2.42	K, 2, 3	3	3	1	Yes
N	.25	.62	.06	K-3	5	3	1	Yes
O	-1.70	-1.03	-3.67	K-3	7	5	1	Yes
<b>Overall</b>	<b>2.36*</b>	<b>1.02</b>	<b>1.11</b>	<b>K-3</b>	<b>4</b>	<b>4</b>	<b>2</b>	<b>Yes</b>

\*p<.05 in regression analyses. ELL status, special education status, underperforming ethnic minority status, and gender are controlled. Shading represents particularly successful schools.

Finally, Table 12 similarly examines kindergarteners' fall 2007 and spring 2008 math KDPR scores. In seven of fifteen schools (A-D, J, N, and O), K-3 Plus students earned on average at least four points more on the KDPR reading assessment in the fall compared to their peers after controlling for socio-economic factors, all of which are statistically significant differences. In the spring, in three of these schools K-3 Plus students continued to earn at least three more points than their peers; two are statistically significant differences. (See Appendix E for more detail regarding the regression analyses in Table 12).

**Table 12: Impact of K-3 Plus on KDPR Math Scores for Kindergarteners**

School	OLS Regressions		Grades	Classes	K-3 Plus summer weeks	Experience	Consistent Teacher for K
	Fall Coeff.	Spring Coeff.					
B	6.89*	.72	K-3	7	5	1	Yes
C	6.29*	5.40*	K-3	6	3	1	Yes
O	6.15*	-5.11*	K-3	7	5	1	Yes
A	5.91*	3.77*	K-3	6	5	2	Yes
D	5.29*	-.20	K-3	4	5	5	Yes
J	4.92*	1.94	K-1	2	3	1	Yes
N	4.07*	-.72	K-3	5	3	1	Yes
G	2.69	.26	K-3	4	5	1	Yes
L	2.56	4.02	K-3	5	3	5	Yes
E	2.15	2.84	K	1	3	1	Yes
H	1.94	.23	K-3	9	3	4	Yes
I	1.61	1.13	K-3	4	3	1	Yes
M	1.41	-.43	K, 2, 3	3	3	1	Yes
K	1.20	1.29	K	2	5	5	Yes
F	-2.12	-1.99	K	1	4	1	Yes
<b>Overall</b>	<b>3.91*</b>	<b>.91</b>	<b>K-3</b>	<b>4</b>	<b>4</b>	<b>2</b>	<b>Yes</b>

\*p<.05 in regression analyses. ELL status, special education status, underperforming ethnic minority status, and gender are controlled. Shading represents particularly successful schools.

Looking at the school-level implementation factors for both kindergarten tables together, there are four schools considered successful for both math and reading - Schools A through D. We concentrate our analyses on these. The data suggest that the size of the program may be important to kindergarteners' achievement. All four schools serve kindergarten through third grade students and have at least the average number of classrooms (four) or more. Unlike the schools whose programs successfully increase achievement among older students, three of these successful schools have all their K-3 Plus days before the regular school year begins, although School C does not. Experience with the program does not impact kindergarteners' success. Unfortunately for this analysis, we cannot assess the impact of keeping students with their K-3 Plus teacher may have for the kindergarteners' achievement since all schools have consistent kindergarten teachers.

As it turns out, none of the four schools identified as being particularly successful regarding kindergarteners' achievement are the same as any of the four schools identified as successfully increasing older students' achievement; nor does this analysis point to the same effective implementation factors. Older students appear to benefit from having K-3 Plus days spread out over the course of the year; while kindergarten students seem to respond best to entirely front-loaded programs. Kindergarteners appear to benefit from larger programs while this factor does not seem to be important to older students. Finally, programs that place K-3 Plus students with their K-3 Plus teacher when the regular school year begins may be more successful with older students. Consistency may be important for kindergarten students as well; the lack of variation makes the hypothesis impossible to test.

## ***Limits to this Research***

This study's results are not necessarily generalizable. Our sample, both in terms of students and schools, is relatively small. K-3 Plus is only in its first year (at least for most schools and grades); implementation and therefore summative results are likely to change over time. Thus, these findings should be considered preliminary.

Threats to validity, the level of confidence we have in the findings, exist as well. This study draws heavily upon the comparison of K-3 Plus students and their peers; importantly, students are not randomly assigned to groups. Indeed we know important differences exist. For instance, K-3 Plus students in 1<sup>st</sup> through 3<sup>rd</sup> grade are more likely to have lower levels of achievement and are more likely to be English Language Learners.<sup>17</sup> While we have attempted to statistically control this selection bias, it is highly unlikely we are able to completely capture pre-existing differences between K-3 Plus students and their peers. The effect of this bias is probably to overestimate the impact of K-3 Plus. On the other hand, it is possible that the K-3 Plus program has 'spillover' effects such that K-3 Plus students help tutor other students when the regular school begins. Non-participants may catch up with K-3 Plus participants by learning material more quickly than they would without the K-3 Plus program. These analyses may therefore underestimate the positive impacts of K-3 Plus. There are also weaknesses in outcome measures, particularly achievement scores. The use of broad benchmark assessments as a measure of success for relatively short academic programs is often problematic since it is unlikely that the program could address all the components tested in a benchmark assessment. For kindergarteners and all math analyses, we lack a known important control variable, previous achievement; and without a standard district assessment we cannot assess 1<sup>st</sup> and 2<sup>nd</sup> grade students' math achievement at all. Finally, the lack of absence data in most schools is regrettable, as a key feature of implementation success is the extent to which students participate in the intervention (dosage).

## ***Summary and Conclusions***

This evaluation sought to answer two summative questions. First, does the K-3 Plus program encourage families to remain in the same school? and second, how do academic outcomes compare for K-3 Plus students and their peers? We also asked what school-level factors might be associated with more successful K-3 Plus programs.

These results suggest that in its first year, K-3 Plus does not seem to improve school stability overall. However, the K-3 Plus program did seem to have this effect in a few schools. Two factors may be associated with this success – larger programs and keeping all K-3 Plus days in the summer before the regular school year begins.

Not surprisingly, K-3 Plus has its strongest academic impact on fall benchmark assessments, directly following the program, though results vary by grade and by school. In this study, the

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<sup>17</sup> Carrillo, N. 2008. A Formative Evaluation of the K-3 Plus Program. Albuquerque Public Schools. [http://www.rda.aps.edu/RDA/Documents/Publications/07\\_08/K-3\\_Plus\\_Formative\\_Evaluation\\_I.pdf](http://www.rda.aps.edu/RDA/Documents/Publications/07_08/K-3_Plus_Formative_Evaluation_I.pdf).

impact of K-3 Plus seems to hold the longest in 2<sup>nd</sup> and 3<sup>rd</sup> grade, at least for reading. If further research finds similar results, this could be true for a number of reasons. For example, it is perhaps likely that K-3 Plus is considered more of a priority for families of older students, especially if the students are struggling in school. There may be something about the 2<sup>nd</sup> and 3<sup>rd</sup> grade instruction itself that helps it to ‘stick’ longer. Or schools and/or families may be better at targeting older children as students likely to benefit from K-3 Plus.

Certainly academic achievement varies by school as well. Unfortunately, our examination of school-level implementation factors revealed no strong or consistent factors. There seems to be some tendency for schools that front-load their program and have larger programs to be more successful with kindergarten students. Yet what seems to be helpful for older students is a program that keeps them with their K-3 Plus teacher after the regular school year begins and spreading K-3 Plus days throughout the year.

This study also points to particular areas of further research. Additional years will provide data that will improve the validity and generalizability of results. Certainly, incorporating attendance or dosage information will help clarify achievement results. Two additional questions may warrant further attention as well. First, what is the impact of adding students after the regular school year begins? In other words, do the benefits of relatively small K-3 Plus summer classrooms outweigh the challenges of adding many new students when the regular school year begins? Second, are there classroom-level implementation factors that can help explain variation in results?

While keeping in mind that these results are preliminary, it makes sense for schools to build as large a program (multiple grades and classrooms) as possible and to try to keep students with their K-3 Plus teacher when the regular school year begins. We are reticent to give advice to schools in terms of when K-3 Plus days should take place, since the findings presented here are contradictory. Schools should consider their particular goals when using this report to design their programs.

**Appendix A: Full Regression Analysis Results for Tables 2-7**

**Table 2: Regressing K-3 Participation on Fall 2007 Reading Scores by Grade and Assessment**

	Kindergarten	1 <sup>st</sup> Grade	2 <sup>nd</sup> Grade	3 <sup>rd</sup> Grade	
Assessment:	KDPR	DRA	DRA	DRA	A2L
School <i>n</i>	16	11	12	8	9
Student <i>n</i>	1398	640	769	392	407
<i>r</i> <sup>2</sup>	.12	.17	.66	.56	.37
<b>K-3 Participation</b>	<b>2.35*</b> <b>(.59)</b>	<b>.40</b> <b>(.31)</b>	<b>.97*</b> <b>(.27)</b>	<b>1.06*</b> <b>(.17)</b>	<b>.41</b> <b>(1.87)</b>
ELL	-2.74* (.45)	-.50* (.20)	-.61* (.21)	-1.18* (.38)	-5.95* (2.43)
SPED	-2.23* (.29)	-.92* (.25)	-.68* (.28)	-1.32* (.44)	-3.33 (2.21)
Under-performing Minority	-1.02 (.81)	-.59 (.35)	-.54 (.28)	-.42* (.16)	.30 (4.39)
Female	.57 (.33)	.39 (.18)	.19 (.13)	.08 (.11)	1.75 (1.74)
Spring 2007 Reading Score	n/a	.15* (.02)	.82* (.05)	.61* (.16)	2.33* (.31)

\*p<.05. Standard errors indicated in parentheses.

**Table 3: Regressing K-3 Participation on Fall 2007 Math Scores, K & 3<sup>rd</sup> Grade**

	Kindergarten	3 <sup>rd</sup> Grade
Assessment:	KDPR	A2L Math
School <i>n</i>	16	12
Student <i>n</i>	1,398	802
<i>r</i> <sup>2</sup>	.11	.12
<b>K-3 Participation</b>	<b>3.91*</b> <b>(1.05)</b>	<b>.47</b> <b>(1.55)</b>
ELL	-3.91 (1.05)	-9.45* (1.60)
SPED	-3.91 (.53)	-6.57* (1.57)
Under-performing Minority	-.94 (1.47)	-8.13* (2.22)
Female	.23 (.58)	.24 (.98)

\*p<.05. Standard errors indicated in parentheses.

Appendix A continued: Full Regression Analysis Results for Tables 2-7

**Table 4: Regressing K-3 Participation on Winter 2008 Reading Scores by Grade and Assessment**

	Kindergarten	1 <sup>st</sup> Grade	2 <sup>nd</sup> Grade	3 <sup>rd</sup> Grade	
Assessment:	KDPR	DRA	DRA	DRA	A2L
School <i>n</i>	15	13	13	9	10
Student <i>n</i>	1,298	771	857	475	437
<i>r</i> <sup>2</sup>	.09	.25	.65	.61	.39
<b>K-3 Participation</b>	<b>1.02</b> <b>(.61)</b>	<b>-.05</b> <b>(.34)</b>	<b>.71*</b> <b>(.23)</b>	<b>.70*</b> <b>(.24)</b>	<b>-.70</b> <b>(1.70)</b>
ELL	-2.49* (.63)	.09 (.30)	-.52* (.22)	-.95* (.36)	-6.28* (1.98)
SPED	-3.62* (.66)	-1.58* (.29)	-1.19* (.26)	-.90* (.38)	-1.16 (2.40)
Under-performing Minority	.03 (.62)	-.45 (.42)	-.53* (.22)	-.65* (.16)	5.95 (5.51)
Female	.58 (.44)	.33 (.19)	.37* (.04)	.24 (.16)	1.48 (1.58)
Spring 07 KDPR Reading Score	n/a	.23* (.02)	.85* (.04)	.60* (.12)	2.21* (.36)

\*p<.05. Standard errors indicated in parentheses.

**Table 5: Regressing K-3 Participation on Winter 2008 Math Scores, K and 3<sup>rd</sup> Grade**

	Kindergarten	3 <sup>rd</sup> Grade
Assessment:	KDPR	A2L Math
School <i>n</i>	15	13
Student <i>n</i>	1,298	967
<i>r</i> <sup>2</sup>	.09	.00
<b>K-3 Participation</b>	<b>.91</b> <b>(2.06)</b>	<b>-.78</b> <b>(1.82)</b>
ELL	4.94* (1.55)	-10.51* (1.81)
SPED	-2.37* (.81)	-7.61* (1.17)
Under-performing Minority	3.27* (.92)	-.30 (2.10)
Female	-.90 (.51)	-1.30 (1.03)

\*p<.05. Standard errors indicated in parentheses.

**Appendix A continued: Full Regression Analysis Results for Tables 2-7**

**Table 6: Regressing K-3 Participation on Spring 2008 Reading Scores by Grade and Assessment**

	Kindergarten	1 <sup>st</sup> Grade	2 <sup>nd</sup> Grade	3 <sup>rd</sup> Grade	
Assessment:	KDPR	DRA	DRA	DRA	A2L
School <i>n</i>	15	12	12	9	9
Student <i>n</i>	1,272	757	830	471	424
<i>r</i> <sup>2</sup>	.09	.29	.62	.60	.38
<b>K-3 Participation</b>	<b>1.11</b> <b>(.70)</b>	<b>-.07</b> <b>(.34)</b>	<b>.57*</b> <b>(.23)</b>	<b>-.26</b> <b>(.29)</b>	<b>.83</b> <b>(1.07)</b>
ELL	-1.95* (.49)	.47 (.27)	-.32 (.22)	-.91 (.51)	-6.32* (2.23)
SPED	-5.35* (1.18)	-1.82* (.36)	-1.62* (.37)	-1.17* (.35)	-.56 (3.21)
Under-performing Minority	-.50 (.35)	-.74 (.41)	-.13 (.24)	-.23 (.22)	3.43 (3.89)
Female	.89 (.45)	.36 (.20)	.29* (.11)	.30* (.14)	1.44 (1.22)
Spring 07 KDPR Reading Score	n/a	.29* (.03)	.85* (.05)	.60* (.13)	2.41* (.34)

\*p<.05. Standard errors indicated in parentheses.

**Table 7: Regressing K-3 Participation on Spring 2008 Math Scores, K and 3<sup>rd</sup> Grade**

	Kindergarten	3 <sup>rd</sup> Grade
Assessment:	KDPR	A2L Math
School <i>n</i>	15	13
Student <i>n</i>	1,272	946
<i>R</i> <sup>2</sup>	.07	.15
<b>K-3 Participation</b>	<b>1.41</b> <b>(.78)</b>	<b>1.03</b> <b>(2.54)</b>
ELL	-1.86* (.34)	-12.66* (2.03)
SPED	-4.55* (1.27)	-8.83* (.93)
Under-performing Minority	.27 (.31)	-.90 (2.23)
Female	.03 (.46)	-1.31 (.97)

\*p<.05. Standard errors indicated in parentheses.

**Appendix B: Stability Differences Between K-3 Plus and Peer Families by Grade and by School: Student t-tests**

	<b>K-3 Plus Students</b>		<b>Non-Participants</b>		<b>Difference</b>	<b>T</b>
	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>		
<b>Overall</b>	<b>549</b>	<b>93%</b>	<b>1,780</b>	<b>92%</b>	<b>.01</b>	<b>.19</b>
<i>By School</i>						
I	55	93%	82	84%	.09	1.6
II	61	98%	102	91%	.07	2.2*
III	31	100%	157	94%	.06	3.1*
IV	45	98%	168	93%	.05	1.6
V	77	92%	114	92%	0	.03
VI	53	94%	101	95%	-.01	.2
VII	24	92%	48	94%	-.02	.3
VIII	24	83%	57	86%	-.03	.3
IX	70	90%	460	94%	-.04	1.0
X	25	92%	119	97%	-.05	1.0
XI	25	84%	132	90%	-.06	.8
XII	48	88%	195	94%	-.06	1.2
XIII	11	100%	45	78%	.22	n/a (low n)

\*p<.05

**Appendix C: Regressing Fall Proficiency on K-3 Participation, Grades 1 through 3: Logit Analyses**

School:	1	2	3	4	5	6	7	8	9	10	11	12	13
<i>n</i>	147	51	78	144	288	181	71	203	139	179	126	494	161
<b>K3 Plus Participation</b>	<b>1.98*</b> (.92)	<b>1.80</b> (1.57)	<b>1.22</b> (.81)	<b>1.10*</b> (.46)	<b>.57</b> (.40)	<b>.53</b> (.52)	<b>.51</b> (.72)	<b>.50</b> (.44)	<b>.38</b> (.68)	<b>.27</b> (.36)	<b>-.03</b> (.44)	<b>-.12</b> (.32)	<b>-.16</b> (.39)
ELL status	-1.03 (.67)	-1.57 (1.58)	-.59 (.64)	-.82 (.51)	-1.28* (.34)	-.33 (.42)	-.52 (.71)	-1.46* (.39)	-.79 (.50)	-.69* (.35)	-.86 (.49)	-.53* (.22)	-.08 (.39)
SPED status	-1.57* (.71)	-3.76* (1.79)	-.04 (.88)	.04 (.70)	-.16 (.75)	-.59 (.57)	-1.17 (.81)	-1.00* (.45)	-1.28 (.75)	-.10 (.72)	-.63 (.67)	-.80* (.33)	n/a
Underperforming Ethnic minority	-1.92* (.61)	n/a	.60 (1.58)	-.08 (.86)	.05 (.77)	1.24 (1.43)	n/a	.10 (.55)	n/a	-1.23 (1.22)	.37 (.79)	-.50 (.41)	-.69 (.58)
Female	-.43 (.48)	n/a	-.46 (.59)	.09 (.43)	.37 (.31)	.63 (.38)	-.52 (.74)	.60 (.35)	.23* (.59)	.54 (.35)	-.04 (.42)	.30 (.22)	.68 (.39)
Spring '07 Reading Proficiency	4.84* (1.11)	2.48 (1.78)	2.93* (.82)	2.14* (.44)	1.80* (.35)	2.42* (.43)	3.32* (.87)	2.38* (.43)	3.39* (.59)	1.98* (.37)	2.03* (.48)	2.37* (.27)	2.01* (.42)

\*p<.05. Standard errors in parentheses. "n/a" refers to unknown impact of independent variable due to very large standard error, which can occur when *n* is low. Shading represents particularly successful schools.

**Appendix D: Regressing Fall, Winter, and Spring KDPR Reading Scores on K-3 Participation, Kindergarten: OLS Regression**

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
<b>Fall</b> <i>n</i>	125	109	218	96	69	125	59	100	92	94	82	38	45	64	67
<b>K3 Plus Participation</b>	<b>.497*</b> (.91)	<b>4.67*</b> (1.25)	<b>4.15*</b> (.74)	<b>3.18*</b> (1.45)	<b>2.89*</b> (1.44)	<b>2.03*</b> (1.02)	<b>1.98</b> (1.48)	<b>1.78*</b> (.71)	<b>1.69</b> (1.17)	<b>1.47</b> (1.09)	<b>1.28</b> (1.31)	<b>.44</b> <b>2.04</b>	<b>.43</b> <b>2.00</b>	<b>.25</b> <b>1.28</b>	<b>-1.70</b> <b>1.83</b>
ELL status	-3.66* (.76)	3.36* (1.08)	-3.36* (.57)	.13 (1.51)	-4.03* (1.35)	-3.00* (.68)	-2.06 (1.29)	-2.06* (.76)	-2.19* (.94)	-4.22* (.90)	-2.92* (1.22)	-4.50 2.28	-2.65 1.58	-2.13 1.28	-3.35 1.73
SPED status	-1.31 (1.89)	-.73 (.95)	3.23* (.92)	-2.73 (1.72)	-8.26* (2.94)	-1.33 (.83)	-2.62 (2.99)	.13 (1.14)	-3.07* (1.39)	-1.55 (1.39)	-5.42* (1.76)	2.28 3.17	-6.52* 2.61	2.00 3.50	-3.38 2.74
Underperforming Ethnic minority	-.79 (1.55)	1.47 (2.91)	-.60 (1.01)	-2.97* (1.43)	-2.11 (1.49)	.37 (1.51)	-4.78 (2.77)	-1.33 (1.90)	-2.26* (.94)	-.55 (1.38)	-7.05* (3.30)	-6.49 3.26	-1.56 3.97	-1.49 2.59	-5.58 2.10
Gender	.64 (.71)	1.27 (1.10)	.44 (.56)	.60 (1.10)	4.75* (1.13)	-1.06 (.57)	1.97 (1.15)	.22 (.69)	1.08 (.83)	.46 (.88)	-1.22 (1.21)	.30 1.85	1.80 1.61	.10 1.22	-2.62 1.43
<b>Winter</b> <i>n</i>	113	94	190	90	63	127	53	104	78	90	77	36	46	63	59
<b>K3 Plus Participation</b>	<b>3.27*</b> (.87)	<b>-1.28</b> (.97)	<b>-1.40</b> (1.19)	<b>-2.15</b> (1.83)	<b>1.58</b> (1.21)	<b>-5.58</b> (1.07)	<b>2.54</b> (1.54)	<b>1.96</b> (1.06)	<b>1.25</b> (1.38)	<b>1.46</b> (1.10)	<b>.23</b> (1.23)	<b>.95</b> <b>1.34</b>	<b>2.20</b> <b>2.52</b>	<b>.62</b> <b>1.22</b>	<b>-1.03</b> <b>1.41</b>
ELL status	-3.21* (.74)	-.99 (.86)	.31 (.95)	1.06 (2.00)	-3.47* (1.19)	-.61 (.72)	-1.39 (1.35)	1.69 (1.14)	-4.20* (1.10)	-3.43* (.81)	-1.20 (1.15)	-4.21* 1.50	-3.29 1.99	1.26 1.21	-1.11 1.40
SPED status	1.29 (1.84)	-5.56* (1.45)	-5.49* (1.47)	-7.08* (2.14)	-3.69 (2.44)	-1.96 (.89)	-.80 (2.95)	-3.02 (1.61)	-5.13* (2.02)	-1.56 (1.31)	-4.20* (1.70)	.81 1.99	-3.16 2.75	1.81 3.31	-3.67 2.32
Underperforming Ethnic minority	2.77 1.85	-.59 (2.15)	-.17 (1.64)	2.16 (1.82)	-.12 (1.30)	.18 (1.58)	-.30 (2.76)	-.07 (2.83)	-.81 (1.13)	.31 (1.35)	-1.27 (2.56)	-.02 2.08	3.50 5.05	-2.86 2.45	1.60 1.80
Gender	1.23 .70	.99 (.87)	1.49 (.94)	-.14 (1.40)	3.57* (1.00)	.29 (.59)	-.07 (1.20)	-.07 (1.03)	.27 (1.00)	.16 (.80)	-1.46 (1.13)	-.89 1.25	-.81 2.04	-1.02 1.16	.71 1.19
<b>Spring</b> <i>n</i>	111	90	207	88	62	121	52	102	76	79	75	36	42	61	55
<b>K3 Plus Participation</b>	<b>4.35*</b> <b>1.20</b>	<b>.89</b> (.94)	<b>2.35</b> (1.37)	<b>1.49</b> (1.62)	<b>4.38*</b> (1.91)	<b>-3.08</b> (2.45)	<b>2.39</b> (3.35)	<b>1.09</b> (1.10)	<b>2.26</b> (1.98)	<b>1.82</b> (1.63)	<b>-1.46</b> (1.92)	<b>2.73</b> <b>2.49</b>	<b>-2.42</b> <b>3.14</b>	<b>.06</b> <b>1.18</b>	<b>-3.67</b> <b>2.00</b>
ELL status	-3.51* 1.04	-2.06* (.85)	-.95 (1.05)	.12 (1.78)	-3.39 (1.90)	-.03 (1.56)	-4.83 (3.03)	-2.36 (1.22)	-3.90* (1.61)	-2.35 (1.37)	-2.76 (1.79)	-6.70* 2.67	-2.34 2.54	-.63 1.20	-1.74 2.07
SPED status	.13 2.92	-5.60* (1.47)	-8.26* (1.68)	-8.19* (1.91)	3.50 (3.87)	-2.26 (1.99)	-.12 (6.41)	-2.22 (1.69)	-10.76* (2.32)	-2.04 (2.11)	-10.24* (2.60)	3.79 3.53	-3.58 3.57	3.31 3.18	-5.58 3.25
Underperforming Ethnic minority	2.99 2.64	-.06 (2.08)	-.92 (1.81)	-.58 (1.63)	-.73 (2.06)	-.40 (3.88)	3.33 (6.02)	-3.30 (2.94)	-.08 (1.64)	-.58 (2.30)	-4.75 (3.94)	-6.33 3.71	.28 6.21	-1.40 2.35	-.37 2.56
Gender	.86 .97	.33 (.86)	2.76 (1.03)	.76 (1.26)	4.24* (1.60)	1.65 (1.29)	.07 (2.67)	.92 (1.02)	-1.41 (1.47)	.84 (1.36)	-1.42 (1.77)	-2.60 2.23	.08 2.65	1.18 1.13	1.84 1.75

\*p<.05. Standard errors in parentheses. Shading represents particularly successful schools.

**Appendix E: Regressing Fall, Winter, and Spring KDPR Math Scores on K-3 Participation, Kindergarten: OLS Regression**

	B	C	O	A	D	J	N	G	L	E	H	I	M	K	F
<b>Fall</b> <i>n</i>	107	218	67	124	95	94	64	59	37	69	100	91	45	82	125
<b>K3 Plus Participation</b>	<b>6.89*</b> <b>(1.89)</b>	<b>6.29*</b> <b>(1.35)</b>	<b>6.15*</b> <b>(2.84)</b>	<b>5.91*</b> <b>(1.37)</b>	<b>5.29*</b> <b>(2.12)</b>	<b>4.92*</b> <b>(1.85)</b>	<b>4.07*</b> <b>(1.68)</b>	<b>2.69</b> <b>(2.39)</b>	<b>2.56</b> <b>(2.82)</b>	<b>2.15</b> <b>(2.03)</b>	<b>1.94</b> <b>(1.05)</b>	<b>1.61</b> <b>(2.13)</b>	<b>1.41</b> <b>(3.36)</b>	<b>1.20</b> <b>(1.79)</b>	<b>-2.12</b> <b>(2.30)</b>
ELL status	-6.50* (1.64)	-4.22* (1.04)	-.46 (2.68)	-4.56* (1.37)	-1.86 (2.41)	-6.72* (1.54)	-.98 (1.67)	-4.36* (2.09)	-9.52* (3.19)	-4.93* (1.90)	-1.46 (1.13)	-2.00* (1.70)	-3.69* (2.64)	-4.44* (1.66)	-4.74* (1.52)
SPED status	-3.80 (2.95)	-6.08* (1.68)	-10.74* (4.25)	-3.19 (2.84)	-2.67 (2.52)	-2.93 (2.37)	5.40 (4.60)	-1.82 (4.82)	2.46 (4.31)	-7.77 (4.12)	-.85 (1.69)	-3.45 (2.51)	-3.03 (3.81)	-7.80* (2.40)	-3.30 (1.87)
Underperforming Ethnic minority	2.82 (4.40)	-1.29 (1.83)	1.39 (3.25)	.18 (2.32)	-5.62* (2.14)	.64 (2.36)	.53 (3.38)	-1.34 (4.47)	-5.30 (4.45)	3.78 (2.09)	-2.34 (2.81)	-2.85 (1.71)	3.25 (6.67)	-6.12 (4.51)	-2.10 (3.39)
Gender	.56 (1.68)	1.77 (1.02)	-3.79 (2.22)	.94 (1.07)	.27 (1.62)	.28 (1.51)	-1.84 (1.59)	2.64 (1.86)	-2.47 (2.58)	4.80* (1.59)	-.22 (1.02)	-.36 (1.50)	1.43 (2.71)	-1.53 (1.65)	-1.14 (1.29)
<b>Spring</b> <i>n</i>	90	207	55	111	88	79	61	52	36	62	102	76	42	75	121
<b>K3 Plus Participation</b>	<b>.72</b> <b>(.75)</b>	<b>5.40*</b> <b>(1.49)</b>	<b>-5.11*</b> <b>(1.47)</b>	<b>3.77*</b> <b>(1.28)</b>	<b>-.20</b> <b>(1.73)</b>	<b>1.94</b> <b>(1.91)</b>	<b>-.72</b> <b>(1.14)</b>	<b>.26</b> <b>(2.97)</b>	<b>4.02</b> <b>(2.55)</b>	<b>2.84</b> <b>(1.66)</b>	<b>.23</b> <b>(.94)</b>	<b>1.13</b> <b>(2.37)</b>	<b>-.43</b> <b>(3.24)</b>	<b>1.29</b> <b>(1.83)</b>	<b>-1.99</b> <b>(2.47)</b>
ELL status	-.48 (.67)	-2.57* (1.15)	1.14 (1.51)	-3.04 (1.11)	.38 (1.90)	-1.90 (1.61)	.97 (1.16)	-5.19* (2.70)	-5.61* (2.75)	-2.20 (1.65)	-1.26 (1.04)	-4.45* (1.93)	-1.83 (2.62)	-3.38 (1.71)	-1.60 (1.57)
SPED status	-6.25* (1.16)	-6.13* (1.84)	-2.02 (2.38)	1.93 (3.11)	-7.25* (2.03)	-1.13 (2.49)	2.55 (3.08)	1.41 (5.69)	3.53 (3.63)	-5.20 (3.37)	-1.16 (1.44)	-16.74* (2.79)	-2.24 (3.68)	-8.70* (2.48)	-1.90 (2.00)
Underperforming Ethnic minority	1.30 (1.65)	.11 (1.98)	2.53 (1.87)	3.00 (2.81)	.48 (1.73)	.99 (2.70)	-2.62 (2.27)	1.74 (5.35)	-6.29 (3.80)	.57 (1.79)	-2.65 (2.51)	1.34 (1.97)	-.11 (6.40)	-3.81 (3.75)	-.24 (3.90)
Gender	.28 (.68)	2.10 (1.12)	1.03 (1.28)	-.26 (1.04)	-1.00 (1.34)	.67 (1.60)	-.37 (1.09)	-.57 (2.34)	-4.85* (2.29)	1.83 (1.39)	.58 (.92)	-3.21 (1.76)	-.14 (2.73)	-2.48 (1.68)	.13 (1.30)

\*p<.05. Standard errors in parentheses. Shading represents particularly successful schools.