

First 5 Service Corps Project Evaluation

First 5 Santa Cruz County

Reading Corps Members Make a Difference



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Introduction

In 1998, voters passed Proposition 10 which levied a tax on tobacco products to fund programs for California's children prenatal through age 5 years and their families. In 2001, First 5 California, the First 5 Association, California Volunteers (the State Commission for the Corporation for National and Community Service (CNCS)), and Prevent Child Abuse California (PCA CA) formed a partnership to implement a statewide AmeriCorps Initiative. Since 2002, the First 5 Service Corps (F5SC) has been deploying AmeriCorps members to help children enter kindergarten developmentally ready to learn and better-prepared to succeed in school. PCA CA administers F5SC program and provides technical assistance for successful placement of AmeriCorps members into school readiness programs run by county level First 5 Commissions throughout the state.

CNCS has provided leadership in furthering collection of evaluative data and the production of increasingly rigorous evaluations. The request for F5SC evaluation services for the period of 2012 through 2014, sought to narrow the scope to programs that had already collected data suitable to conduct a quasi-experimental design (QED) as defined by the What Works Clearinghouse (WWC) as follows:

1. They collect valid and reliable outcome measures;
2. They train and monitor for standardized measurement procedures;
3. There is a comparison group with baseline equivalency; and
4. There are limited attrition rates of target and comparison groups.

The Davis Consultant Network screened two programs for that QED study, the Think Together program in Orange County and the Reading Corps program in Santa Cruz. A full QED study was performed for Think Together¹. The Santa Cruz Reading Corp program demonstrated significant positive change in literacy scores for participating children, but there were no data collected from a comparable group, which prevented analysis using QED.

In this subsequent evaluative cycle, staff from First 5 Santa Cruz recognized an opportunity to meet the qualifications for QED design due to an AmeriCorps member placement challenge. One of its program sites was fully prepared to host two Reading Corps AmeriCorps members who for personal reasons had to drop out of the program. The staff of Starlight State Preschool agreed to allow collection of the early literacy assessment data, despite having no Reading Corps members placed on their teaching team. This provided the program with a comparison group, thus making a QED design possible in studying the impact of placing Reading Corps members within high-quality literacy-rich preschool programs.

¹https://www.nationalservice.gov/sites/default/files/evidenceexchange/FR_CaliforniaChildrenandFamiliesFoundation_First5ServiceCorps.pdf

Research Design

First 5 Santa Cruz was interested in a very specific evaluation question: *How does the delivery of targeted early literacy interventions by trained Reading Corps members impact reading readiness in high-quality preschool classrooms?*

The DCN research team was familiar with the Reading Corps program from the 2014 AmeriCorps evaluation. First 5 Santa Cruz County staff provided information on all programmatic changes since 2014, which were incorporated into the updated program logic model found in Appendix 1. First 5 Santa Cruz County hosted a site visit for the DCN research team on February 10, 2017. The visit provided an opportunity to confirm and clarify programmatic and data issues, as well as an opportunity to observe classrooms with and without Reading Corps members. While at the YWCA State Preschool program, the team observed all three tiers of interventions and two Reading Corps members conducting assessments.

The evaluation methods included key informant interviews with program staff, classroom observations, a review of classroom quality indicators for all sites included in the study, and a quasi-experimental design (QED) study. Early literacy was assessed in the Reading Corps classrooms by Reading Corps members using the Individual Growth and Developmental Indicators of Early Literacy (IGDI). A Reading Corp Literacy Coach performed the IGDI assessments at the control sites.

IGDI scores were collected and provided by First 5 Santa Cruz County for two program years, 2015-2016 and 2016-2017. Scores from each program year were analyzed separately in 5 steps:

1. **Total Sample** - The entire sample demographics were summarized for child gender, ethnicity, home language and age.
2. **Comparison of Group Demographics** - The control and comparison group demographics were reported and compared between groups. T-test and chi-square analyses was performed to determine whether the differences were significant. Additionally, a Fisher exact test was performed for the 2015-2016 sample.
3. **Pre/Post Scores** - Paired t-tests of pre/post assessment scores were performed separately for control and comparison groups to demonstrate gains for each IGDI measure over the 2015-2016 school year. This was done only for the intervention sample with data collected in the 2006-2017 school year.
4. **Group Comparison** - Independent t-tests for each group were performed at each assessment and differences between mean scores reported. This provided a comparison at baseline when the children entered the preschool program, as well as the subsequent two assessment periods. A univariate linear model was used to analyze group differences for 2016-17 IGDI scores.
5. **Differences of Differences** - Finally, independent t-tests were performed to assess differences in the changes in in mean early literacy scores from fall to winter and from fall to spring between students in classrooms with and without a Reading Corps member.

Program Description

First 5 Santa Cruz initiated the Santa Cruz Reading Corps program in 2012. The program deploys trained Reading Corps AmeriCorps members, to State preschool and transitional kindergarten classrooms to engage in early literacy activities throughout the daily routine.

The lead teachers have all been trained to use the *SEEDS of Early Learning*² strategies within a literacy- and math-rich daily schedule. SEEDS of Early Learning is an evidence based professional development program that prepares educators to help children develop the social, emotional, language and literacy skills they need to be ready for kindergarten. Their classrooms are assessed twice per year using the Early Language and Literacy Classroom Observation Tool (ELLCO) to identify the environment's early literacy strengths and areas for program improvement.

SEEDS is an acronym for the five qualities of teacher/ student interaction:

1. to be **Sensitive**
2. to be **Encouraging**;
3. to **Educate**;
4. to “**Develop through doing**” by promoting active learning; and
5. to help develop a positive **Self-image**.

The program also trains “the big 5 early literacy skills”:

1. conversation and oral language;
2. phonological awareness;
3. books and print rules;
4. alphabet knowledge; and
5. vocabulary and meaning of words.



Minnesota Reading Corps Program Model

Early childhood professionals who have taken SEEDS of Early Learning are trained to assess and create classrooms that offer many opportunities for developing literacy skills and integration of literacy-rich exchanges with their students throughout the day.

Classrooms that have teachers that have been SEEDS trained also use the Raising a Reader³ book bag program to ensure that all children have access to appropriate children's literature at home. Raising a Reader is another evidence-based program that bridges at-home and at-school readiness activities.

² <http://www.seeds-learning.com/>

³ <http://www.raisingareader.org>

The Santa Cruz Reading Corps is a national Reading Corps replication partner, which grew out of the Minnesota Reading Corps model. This model utilizes individual assessments to monitor each child's early literacy skills in the predictors of reading success (picture naming, letter names, letter sounds, rhyming, and alliteration).

The children with the lowest benchmark scores receive additional support from the Reading Corps member in the form of an individualized daily intervention. This can happen in a small group (Tier 2) or one-on-one (Tier 3). The length of the intervention session is dependent on the strategy being used by the Reading Corps member.

The most common intervention used in Tier 1 and Tier 2 is the Repeated Read Aloud. In this intervention members utilize intervention scripts to increase vocabulary in the context of a story which is repeated daily. Each day three new words are introduced, repeated, used in context, defined, highlighted in a book, and discussed. As children learn the words, new words are introduced in subsequent days.

Each Reading Corps member receives over 200 hours of training, ongoing supervision and coaching throughout their twelve months of service. Each member is also supported by a Literacy Coach, contracted with First 5 Santa Cruz County. The Literacy Coach observes each Reading Corps member twice a month as they engage in the Literacy and Math Rich Schedule. These coaching sessions include feedback on the strategy observed as well as goal setting. First 5 Santa Cruz County provides overall program support with a Program Manager who handles administrative issues and a Master Literacy Coach who provides training and ongoing content support.

During coaching sessions, Reading Corps members are observed conducting multiple interventions (including Tier 2 and Tier 3) and are scored for fidelity to the model and coached as needed. Similarly, coaches address interrater reliability between Reading Corps members by observing and scoring their implementation of assessments, providing coaching until they achieve the standards.

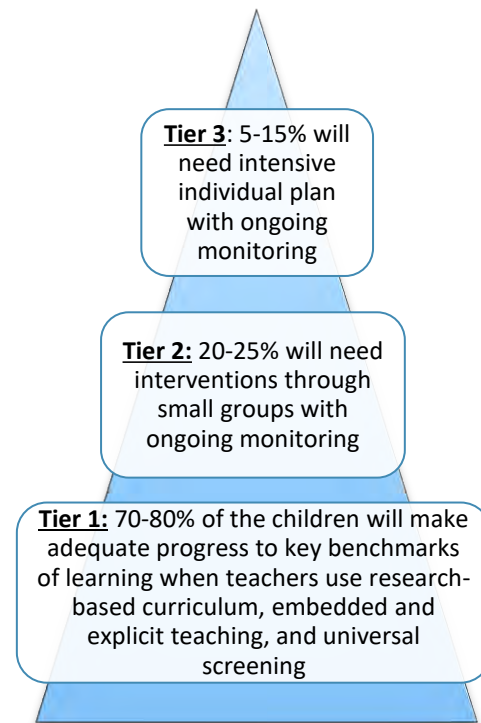


Figure 1: Reading Corps is a Response to Intervention (RTI) model which uses periodic assessment to determine which tier of intervention is most appropriate.

Data Collection

Sample Sites

Only the First 5 Santa Cruz Reading Corps sites with half-day preschool programs serving 4- and 5-year old children were selected for the study to have comparability in preschool program dosage. All lead teachers held site supervision permits and had been trained in the SEEDS of Learning. All sites also participated in the Raising a Reader book bag program. The target and comparison sites were all state preschool programs Data from eleven program sites were included in this study.

The Starlight State Preschool program did not participate in the Reading Corps program in either the 2015-2016 or 2016-17 school years but provided a similar literacy-rich preschool program without any Reading Corps members. The children at this site served as a comparison group. They were assessed by the Master Literacy Coach using the IGDIs three times in the 2015-16 school year and in the winter and spring only in the 2016-17 school year. Data from both school years were separately analyzed and compared with assessment scores from sites with with Reading Corps members.

In the 2015-2016 program year, the literacy environments of all sites in this study, including the two control group classrooms at Starlight State Preschool were assessed. These were performed by the Literacy Coach using the Early Language and Literacy Classroom Observation Tool (ELLCO) (Smith, Dickenson, et al, 2002) in spring 2016. Aggregate average scores ranged from 3.8 to 4.9 with a mean of

Site Name	Site				Lead Teacher	
	Target Site	Reading Corps Members	Comparison Site	Spring ELLCO Score	Site Supervision Permit	SEEDS Trained
1. Bradley State Preschool	●	●		4.2	✓	✓
2. Calabasas State Preschool	●	●		4.1	✓	✓
3. Del Mar State Preschool	●	●		5.0	✓	✓
4. Green Acres State Preschool	●	●		4.9	✓	✓
5. Landmark State Preschool	●	●		3.8	✓	✓
6. Linscott State Preschool	●	●		3.2	✓	✓
7. Live Oak State Preschool	●	●		4.5	✓	✓
8. Rolling Hills State Preschool	●	●		4.0	✓	✓
9. Salsipuedes State Preschool	●	●		4.4	✓	✓
10. Watsonville State Preschool	●	●		3.8	✓	✓
11. Starlight 1 State Preschool			●	4.7	✓	✓
Starlight 2 State Preschool			●	4.4	✓	✓
Mean ELLCO Score →				4.3		

4.3. The two comparison Starlight classrooms achieved scores above the mean in their spring assessment, at 4.7 and 4.4. Since there was continuity of staffing, classrooms, and curriculum, the two Starlight Classrooms were deemed to have a comparable literacy environment as the other classrooms in the study as measured by the ELLCO.

ELLCO Assessment Domains	
Organization of Classroom	Phonological Awareness
Contents of Classroom	Organization of Book Area
Classroom Management	Characteristics of Books
Personnel	Books for Learning
Approaches to Curriculum	Approaches to Book Reading
Opportunities for Child Choice & Initiative	Quality of Book Reading
Recognizing Diversity in the Classroom	Early Writing Environment
Discourse Climate	Support Children's Writing
Efforts to Build Vocabulary	Environmental Print
Opportunities for Extended Conversations	

4.3. The two comparison Starlight classrooms achieved scores above the mean in their spring assessment, at 4.7 and 4.4. Since there was continuity of staffing, classrooms, and curriculum, the two Starlight Classrooms were deemed to have a comparable literacy environment as the other classrooms in the study as measured by the ELLCO.

Early Literacy Measures

The measures for early literacy used in this study are those assessed using the Individual Growth and Developmental Indicators of Early Literacy (IGDIs). The assessments are performed by Reading Corps members who have received an initial full-day training, as well as up to 18 hours of practice using the assessment. Reading Corps literacy coaches observe each member using an integrity checklist to insure fidelity to the tool.

The IGDIs assess early literacy in five domains:

1. alliteration (phonological awareness);
2. letter names;
3. picture naming (oral language);
4. letter sounds/sound identification (alphabet knowledge); and
5. rhyming (phonological awareness).

The IGDIs assessment tool was developed by faculty from the University of Minnesota in the late 1990s based upon ten years of research in measurement procedures. The tool has been empirically evaluated for reliability and validity and is considered psychometrically sound⁴.

⁴ Missal, Kristen and S. McConnell. Psychometric Characteristics of Individual Growth & Development Indicators: Picture Naming, Rhyming, and Alliteration. University of Minnesota, April 2004
<https://pdfs.semanticscholar.org/45b0/d05ce608ef2b0556ce8acf4d8f55b4f1d409.pdf>

2015-2016 School Year Study

Total Sample Demographics

There were 472 total students attending 11 different State Preschool classroom sites in 19 different sessions. The total sample was 53.6% female, 90.5% Hispanic/Latino, and 46.8% Spanish-speaking, with a mean age of 50.3 months at the start of the school year. Scores from one child whose age was greater than 65 months at the start of the school year were disqualified from being included in the study.

	Frequency	Percent
Child Gender		
female	253	53.6
male	219	46.4
Total	472	100.0
Latino/Hispanic		
no	45	9.5
yes	427	90.5
Total	472	100.0
Ethnicity		
Asian	4	.8
Hispanic/Latino	427	90.5
Multi-Racial	6	1.3
Native Hawaiian/Pacific Islander	3	.06
White	32	6.8
Total	472	100.0
Home Language		
English	245	51.9
Spanish	221	46.8
other non-English	6	1.3
Total	472	100.0

	Mean (SD)	Minimum	Maximum
Age in Months	50.32 (5.68)	37	68

Group Comparisons

A quasi-experimental design was employed to determine if Reading Corps member support resulted in increased literacy readiness. The children enrolled in the Starlight classrooms that shared a similar learning environment without the support of Reading Corps members were identified as the control group. This group (n=67), were then compared on all available literacy scores to the intervention group (n=404) of children in classrooms with Reading Corps members.

The control and intervention group demographics were compared using Fisher exact test and two-sample t-test to examine equivalency between groups. Tests show no significant differences between classrooms with a Reading Corps member and the control group classroom in gender and race. However, a large percentage of the control group children (64.2%) came from households where Spanish was the primary language spoken at home than in the intervention group (44.1%). This is likely associated with the observed difference in ethnicity in the intervention group (89.1% Hispanic versus 98.5% in the control group). In addition, the control group was about 3 months older on the average than the intervention group. Attendance data were not available for the 2015-2016 sample.

Control Group Demographics

Demographics - Control Group Only (N=79)					
Age	N	Minimum	Maximum	Mean	Std. Dev
Fall age in months	67	39	68	53.01	5.86

Demographic Variable	Frequency	Percent
Gender		
male	29	43.3
female	38	56.7
Total	67	100.0
Latino/Hispanic		
no	1	1.5
yes	66	98.5
Total	67	100.0
Ethnicity		
Multi-Racial	1	1.5
Hispanic/Latino	66	98.5
Total	67	100.0
Home Language		
English	24	35.8
Spanish	43	64.2
Total	67	100.0

Intervention Group Demographics

Demographics - Reading Corps Member Group Only (N=461)					
Age	N	Minimum	Maximum	Mean	Std. Deviation
Fall age in months	404	37.00	60.00	49.86	5.54

Demographic Variable	Frequency	Percent
Gender		
female	215	53.2
male	189	46.8
Total	404	100.0
Latino/Hispanic		
no	44	10.9
yes	360	89.1
Total	404	100.0
Ethnicity		
Asian	4	1.0
Hispanic/Latino	360	89.1
Multi-Racial	5	1.2
Native Hawaiian/ Pacific Islander	3	.7
White	32	7.9
Total	404	100.0
Home Language		
English	220	54.5
Spanish	178	44.1
other non-English	6	1.5
Total	404	100.0

Pre/Post Early Literacy Comparison within Groups

To address whether the children in the either program showed improved early literacy over the preschool program year, pre-post (paired t-test) comparisons were performed for fall to winter and fall to spring scores on the five literacy scales: *Alliteration*, *Letter Sounds*, *Letter Names*, *Rhyming*, and *Picture Naming* for both groups.

Control Group

In the control group, children's scores increased in *Alliteration*, and *Letter Names* ($p < .05$) between fall and winter assessments and between *Alliteration*, *Letter Names* and *Picture Naming* between fall and spring with medium to large effect size (Cohen's d score). Out of a total of 67 possible pairs, the percentage of missing pairs ranged from 1.5% to 67.2% for the five outcome variables, and missing data may have affected these results.

Control Group IDGI Outcome Composites

Measure	Assessment	Mean	SD	Included		Missing		n
				#	%	#	%	
Alliteration	Fall	0.16	0.81	63	94.0	4	6.0	67
	Winter	1.44	2.38	25	37.3	42	62.7	67
	Spring	2.50	3.15	24	35.8	43	64.2	67
Letter Names	Fall	3.50	5.91	54	80.6	13	19.4	67
	Winter	4.64	6.91	28	41.8	39	58.2	67
	Spring	6.00	7.07	25	37.3	42	62.7	67
Letter Sounds	Fall	0.83	2.41	52	77.6	15	22.4	67
	Winter	1.08	2.64	25	37.3	42	62.7	67
	Spring	1.52	3.65	25	37.3	42	62.7	67
Picture Names	Fall	6.40	7.81	65	97.0	2	3.0	67
	Winter	8.32	7.77	28	41.8	39	58.2	67
	Spring	10.76	9.11	25	37.3	42	62.7	67
Rhyming	Fall	1.52	3.33	66	98.5	1	1.5	67
	Winter	0.23	0.75	22	32.8	45	67.2	67
	Spring	2.30	4.25	23	34.3	44	65.7	67

Control Group Pre-Post Paired T-Tests

IGDI Measure	Fall to Winter					Fall to Spring				
	t-value	p	n	Cohen's d*	missing	t	p	n	Cohen's d*	missing
Alliteration	2.478	0.0214	23	0.52	63	3.132	0.0052	21	0.68	67
Letter Names	3.382	0.0023	27	0.65	50	4.518	0.0002	24	0.92	56
Letter Sounds	0.485	0.6330	22	0.10	58	1.162	0.2582	22	0.25	58
Picture Names	1.918	0.0662	27	0.37	58	3.939	0.0007	24	0.80	63
Rhyming	-2.163	0.0429	21	-0.47	68	1.244	0.2272	22	0.27	67

*Cohen's d scores from .5 to .8 are considered to have medium effects. Scores of .8 or more are considered to have a large effect size.

Intervention Group

In the intervention group, children’s scores increased in all five measures ($p < .05$) between fall and winter assessments and between fall and spring assessments. The gains over the course of the school year were statistically significant ($p < .0001$) and large to very large (Cohen’s $D > .8$). Out of a total of 404 possible pairs, the percentage of missing pairs ranged from 7.2% to 47.8% for the five outcome variables.

Intervention Group IDGI Outcome Composites

Measure	Assessment	Mean	SD	Included		Missing		n
				#	%	#	%	
Alliteration	Fall	1.27	2.40	335	82.9	69	17.1	404
	Winter	2.25	3.63	370	91.6	34	8.4	404
	Spring	4.33	4.43	343	84.9	61	15.1	404
Letter Names	Fall	4.23	7.63	226	55.9	178	44.1	404
	Winter	8.30	9.36	258	63.9	146	36.1	404
	Spring	14.31	11.81	215	53.2	189	46.8	404
Letter Sounds	Fall	1.82	4.14	221	54.7	183	45.3	404
	Winter	4.68	6.51	238	58.9	166	41.1	404
	Spring	8.64	8.35	211	52.2	193	47.8	404
Picture Names	Fall	8.90	6.91	320	79.2	84	20.8	404
	Winter	13.51	8.14	375	92.8	29	7.2	404
	Spring	19.64	8.37	347	85.9	57	14.1	404
Rhyming	Fall	1.68	3.27	331	81.9	73	18.1	404
	Winter	3.46	4.66	369	91.3	35	8.7	404
	Spring	5.97	6.06	344	85.1	60	14.9	404

Intervention Group Pre-Post Paired T-Tests

IGDI Measure	Fall to Winter					Fall to Spring				
	t-value	p	n	Cohen’s D	Missing	t-value	p	n	Cohen’s D	Missing
Alliteration	5.542	0*	317	0.31	5	12.611	0*	289	0.74	14
Letter Names	8.221	0*	211	0.57	7	15.142	0*	195	1.08	14
Letter Sounds	8.766	0*	208	0.61	6	12.906	0*	185	0.95	16
Picture Names	17.132	0*	305	0.98	5	30.618	0*	281	1.83	12
Rhyming	8.655	0*	312	0.49	6	13.730	0*	286	0.81	14

*All p-values were less than .0001.

Group Comparisons

The control and intervention group mean scores were compared. Independent t-tests showed significantly higher baseline scores (fall) in the group with Reading Corps members in the three areas of *Alliteration*, *Letter Sounds*, and *Picture Names*.

There was greater equivalency in baseline scores for *Letter Names* and *Rhyming* at the initial assessment in the fall. In these two measures, significantly greater gains were seen in the intervention group in both the winter and spring assessments.

Direct Comparisons of Mean Scores Across Groups

Measure	Assessment	Reading Corps	Control	Difference	t Value	p Value	Degrees of Freedom	Cohen's d
Alliteration	Fall	1.27	0.16	1.11	6.664	0.0000	291	0.50
	Winter	2.25	1.44	0.81	1.583	0.1232	32	0.23
	Spring	4.33	2.50	1.83	2.664	0.0124	30	0.42
Letter Names	Fall	4.23	3.50	0.73	0.773	0.4416	100	0.10
	Winter	8.30	4.64	3.66	2.555	0.0147	39	0.40
	Spring	14.31	6.00	8.31	5.107	0.0000	42	0.73
Letter Sounds	Fall	1.82	0.83	0.99	2.282	0.0241	132	0.26
	Winter	4.68	1.08	3.60	5.320	0.0000	62	0.58
	Spring	8.64	1.52	7.12	7.654	0.0000	60	0.89
Picture Names	Fall	8.90	6.40	2.50	2.394	0.0188	86	0.35
	Winter	13.51	8.32	5.19	3.400	0.0018	32	0.64
	Spring	19.64	10.76	8.88	4.731	0.0001	27	1.05
Rhyming	Fall	1.68	1.52	0.17	0.375	0.7088	92	0.05
	Winter	3.46	0.23	3.23	11.117	0.0000	175	0.71
	Spring	5.97	2.30	3.66	3.878	0.0006	28	0.61

Change Scores

The change in mean scores were compared between the two groups, revealing significantly higher gains in *Letter Naming*, *Letter Sounds*, *Picture Naming*, and *Rhyming* in the Reading Corps member group as compared to the control group. The effect sizes were large to very large for both fall to winter and even greater from fall to spring in these four measures.

Fall to Winter Mean Change Score Comparison

IGDI Measure	Reading Corps	Control Group	Difference	t	p	df	Cohen's d
Alliteration	1.23	1.39	-0.16	-0.272	0.7875	29	-0.06
Letter Names	4.15	1.48	2.67	3.994	0.0001	116	0.82
Letter Sounds	3.00	0.14	2.86	6.458	0.0000	105	1.46
Picture Names	5.26	1.93	3.33	3.171	0.0034	31	0.64
Rhyming	1.96	-1.90	3.87	4.254	0.0003	23	0.96

Fall to Spring Mean Change Score Comparison

IGDI Measure	Reading Corps	Control Group	Difference	t	p	df	Cohen's d
Alliteration	3.27	2.14	1.13	1.545	0.1344	26	0.35
Letter Names	9.98	3.29	6.69	6.808	0.0000	70	1.48
Letter Sounds	6.74	0.50	6.24	9.223	0.0000	103	2.10
Picture Names	11.03	4.92	6.12	4.708	0.0001	27	1.00
Rhyming	4.34	0.68	3.66	5.785	0.0000	37	1.28

2016-2017 School Year Study

Sample Demographics

There were 462 total students attending 11 different State Preschool sites in 21 different sessions. The total sample was evenly divided by gender, 92% Hispanic/Latino, and 64% Spanish-speaking, with a mean age of 49.8 months at the start of the year.

	Frequency	Percent
Child Gender		
male	231	50.0
female	231	50.0
Total	462	100.0
Latino/Hispanic		
no	35	7.6
yes	427	92.4
Total	462	100.0
Ethnicity		
White	31	6.7
Hispanic/Latino	427	92.4
American Indian	1	.2
Multi-Racial	3	.6
Total	462	100.0
Home Language		
English	163	35.3
Spanish	297	64.3
other non-English	2	.4
Total	462	100.0

	Mean (SD)	Minimum	Maximum
Age in Months	49.80 (5.99)	35.00	60.00

Pre/Post Literacy Comparison for Intervention Sample

To address whether the children in the program showed improvement over time, pre-post (paired t-test) comparisons were performed from fall to spring scores on the five literacy scales: *Alliteration*, *Letter Sounds*, *Letter Names*, *Rhyming*, and *Picture Naming* for the entire sample. Results indicate that there were significantly ($p < .001$) higher scores in spring for all literacy scores, with effect size (Cohen's d) scores ranging from .62 to 1.27, which can be considered as medium or large effects. Out of a total of 383 possible pairs, the percentage of missing pairs ranged from 26% to 53% for the five outcome variables, and missing data may have affected these results, especially for *Letter Sounds*.

Pre-Post Comparisons Fall to Spring						
IGDI Measure	Assessment	Mean	N	SD	t	Effect Size (Cohen's d)
Letter Naming	Spring	13.84	281	12.36	18.50	.827 (large)
	Fall	4.35	281	8.33		
Letter Sounds	Spring	9.05	179	9.50	11.98	.620 (medium)
	Fall	2.34	179	5.28		
Picture Naming	Spring	20.96	282	8.48	27.21	1.27 (large)
	Fall	10.45	282	8.06		
Rhyming	Spring	6.34	280	6.08	14.34	.863 (large)
	Fall	1.80	280	3.40		
Alliteration	Spring	4.11	279	4.52	11.58	.773 (medium)
	Fall	1.17	279	2.38		

Effects are significant $p < .001$

Group Comparisons

A quasi-experimental design was employed to determine if having Reading Corps members support resulted in increased literacy readiness. Once again, the Starlight classroom children were identified as the control group, who had a similar learning environment, but who were without the support of Reading Corps members. This group (n=79), were then compared to the remaining group (n=383) with Reading Corps members on winter and spring literacy scores. No fall scores were collected at the control site.

Chi-square and t-tests were performed to examine equivalency between groups. Tests show no significant differences between intervention and control group samples in age, ethnicity, gender, home language. However, the control group children attended their preschool program significantly more program days (M =155.57) than the group of children receiving Reading Corps member interventions (M= 132.59). $t(428) = 4.008, p < .001$.

Demographics - Control Group Only (N=79)					
Age	N	Minimum	Maximum	Mean	Std. Dev
Fall age in months	79	37.00	60.00	51.00	6.387

Demographic Variable	Frequency	Percent
Gender		
male	40	50.6
female	39	49.4
Total	79	100.0
Latino/Hispanic		
no	4	5.1
yes	75	94.9
Total	79	100.0
Ethnicity		
White	4	5.1
Hispanic/Latino	75	94.9
Total	79	100.0
Home Language		
English	32	40.5
Spanish	47	59.5
Total	79	100.0

Demographics - Reading Corps Member Group Only (N=461)					
Age	N	Minimum	Maximum	Mean	Std. Deviation
Fall age in months	462	35.00	60.00	49.80	5.99

Demographic Variable	Frequency	Percent
Gender		
male	191	49.9
female	192	50.1
Total	383	100.0
Latino/Hispanic		
no	31	8.1
yes	352	91.9
Total	383	100.0
Ethnicity		
White	27	7.0
Hispanic/Latino	352	91.9
American Indian	1	.3
Multi-Racial	3	.8
Total	383	100.0
Home Language		
English	131	34.2
Spanish	250	65.3
other non-English	2	.5
Total	383	100.0

Pre/Post Early Literacy Comparisons, Group Comparison and Change Scores

Only winter and spring assessments were performed in the control group, allowing for comparison at only these time points. Independent t tests showed significantly higher scores in the group with Reading Corps members for spring scores for *Alliteration*, *Letter Naming*, *Letter Sounds*, and *Picture Naming*. There were also significantly higher winter scores in the Reading Corps member group in *Letter Naming*, *Letter Sounds* and *Picture Naming*.

Because fall scores were missing, it was not possible to assess a true (fall) baseline in a quasi-experimental design. If winter is used as the baseline, it is difficult to determine whether group differences in spring are attributable to initial differences in fall, or to differences associated with 3 months of program attendance. In these cases, change/gain scores are sometimes used to adjust for those initial differences. Change scores were therefore compared between the two groups, revealing significantly higher gains in *Letter Naming*, *Picture Naming*, and *Letter Sounds* in the Reading Corps member group as compared to the Control (no member) group.

	Groups	N	Mean	Std. Deviation
Literacy Scores				
Alliteration - Winter	Control	74	1.50	2.48
	Reading Corps	348	2.09	3.40
Alliteration - Spring	Control	75	2.44	3.52
	Reading Corps	341	3.78	4.50
Letter Naming - Winter	Control	78	4.29	7.87
	Reading Corps	348	8.06	11.09
Letter Naming - Spring	Control	74	6.77	8.74
	Reading Corps	342	12.61	12.03
Letter Sounds - Winter	Control	78	1.12	2.35
	Reading Corps	221	4.38	6.87
Letter Sounds - Spring	Control	66	2.00	5.04
	Reading Corps	214	8.12	9.10
Picture Naming - Winter	Control	78	11.44	8.63
	Reading Corps	350	14.70	9.36
Picture Naming - Spring	Control	77	13.64	9.34
	Reading Corps	344	19.82	9.37
Rhyming - Winter	Control	78	2.08	3.93
	Reading Corps	350	3.21	5.08
Rhyming - Spring	Control	74	4.62	4.64
	Reading Corps	342	5.82	6.15

	Groups	N	Mean	Std. Deviation
Change Scores				
Change Alliteration (Winter to Spring)	Control	70	1.0857	3.57423
	Reading Corps	319	1.6897	3.83720
Change Letter Naming (Winter to Spring)	Control	73	2.7945	5.43384
	Reading Corps	320	4.3875	6.23670
Change Picture Naming (Winter to Spring)	Control	76	2.5000	6.27907
	Reading Corps	323	4.9319	5.65534
Change Rhyme (Winter to Spring)	Control	73	2.6986	4.19220
	Reading Corps	321	2.6947	4.89007
Change Letter Sounds (Winter to Spring)	Control	65	.9538	4.15869
	Reading Corps	201	3.8308	5.28500

T Test Comparisons			
	t	df	Significant Findings
Literacy Scores			
Alliteration - Winter	-1.406 ns	420	
Alliteration - Spring	-2.426*	414	Reading Corps Group > Control
Letter Naming - Winter	-2.841**	424	Reading Corps Group > Control
Letter Naming - Spring	-3.954***	414	Reading Corps Group > Control
Letter Sounds - Winter	-4.111***	297	Reading Corps Group > Control
Letter Sounds - Spring	-5.224***	278	Reading Corps Group > Control
Picture Naming - Winter	-2.821**	426	Reading Corps Group > Control
Picture Naming - Spring	-5.240***	419	Reading Corps Group > Control
Rhyming - Winter	-1.844ns	426	
Rhyming - Spring	-1.580ns	414	
Change Scores			
Change Alliteration	-1.207ns	387	
Change Letter Naming	-2.014*	391	Reading Corps Group > Control
Change Picture Naming	-3.301**	397	Reading Corps Group > Control
Change Rhyme	.006 ns	392	
Change Letter Sounds	-4.004***	264	Reading Corps Group > Control

* $p < .05$; ** $p < .01$; *** $p < .001$

Conclusions

This multi-year study demonstrates that targeted early literacy interventions by trained First 5 Reading Corps members contribute to gains in early literacy skills for children in high quality preschools. Consistently over two program-years, within a 4-5-month period, children in preschool programs with Reading Corps members demonstrated greater gains than children in comparison classrooms in three emergent literacy skills: letter names, letter sounds and picture names. Data from the first year of the study found this to be true for rhyming as well. This is important because these skills help children decode words and develop their vocabulary.

The Santa Cruz Reading Corps program serves lower income families that meet the household income thresholds to qualify for California State Preschool. Over half of the population studied came from families where Spanish was the primary home language.⁵ These findings of this study suggest that the Reading Corps model can contribute to improved early literacy for a large segment of California's early learners, our English learner population.

The comparison between control and intervention groups strongly suggests that the inclusion of Reading Corps members improves overall early literacy scores of preschool children. The study separately analyzed early literacy assessment scores from two program years using a quasi-experimental design.

The 2015-2016 program-year control and intervention groups were similar in gender and race. The control group had a greater percentage of Spanish speakers and were on the average 3 months older than the average age in the intervention sites. Despite a large percentage of missing control group assessment data, there was evidence of gains in the control group in alliteration, letter names and picture names over the course of the program-year. Strong pre-post gains in all five measures were found for children in the Reading Corps classrooms. There was a lack of baseline equivalency in alliteration, letter sounds, and picture naming between the two groups rendering direct mean score comparison of spring scores between the control and intervention groups invalid. In letter names and picture names there was baseline equivalency and mean scores in the spring were significantly greater in Reading Corps classrooms than the control site. When gains were compared between the two groups, overall, students from Reading Corps classrooms saw significantly greater gains in letter names, letter sounds, picture names and rhyming.

The 2016-2017 program-year control and intervention groups were equivalent in age, gender, ethnicity and home language. Control group children attended more school days than the intervention group. In the available 2016-17 sample there were no true baseline (fall) scores of the control group to assess whether there were pre-existing skill differences in the groups at the start of the program year. The mid-year (winter) assessments did not show equivalency between the groups by that point in time. While children in the Reading Corps member group were significantly better at winter, the lack of baseline equivalency renders direct comparisons of spring scores between the control and intervention groups invalid. The analysis of the change scores did reveal significant gains in some of the scores but this is not a perfect solution to the problem of lack of initial equivalency. This lack of baseline equivalency is a methodological weakness in the study of 2016-2017 data.

Together, the findings from two distinct program years builds a strong case that the Reading Corps program is an effective model for building specific early literacy skills in high quality preschools.

⁵ Statistical comparison of gains by home language will be performed by February 2018.

Appendix 1: Program Logic Model

Appendix 1: Logic Model - Santa Cruz Reading Corps Program Years 2015-17			
Resources	Activities	Outputs	Outcomes
<p>First 5 Staff</p> <ul style="list-style-type: none"> ▪ \$460,000 total contribution (F5SCC staff, contacted literacy coaches, 20 members living allowance, all trainings & materials, Reading Corps fee of \$18,000 ▪ 1 FTE First 5 Santa Cruz Reading Corps Manager (Christine Sieburg) ▪ .60 FTE SEEDS Master Coach (Irene Freiberg) <p>2 Literacy Coaches Contracted through First 5 Santa Cruz County</p> <p>AmeriCorps Members 20 AmeriCorps members serving as Reading Corps members (32-35 hours/week) 900 service hours in a 9-month period (September 1- May 31)</p> <p>5 School District / Program Partners</p> <ul style="list-style-type: none"> • Pajaro Valley School District, 13 classrooms/ 18 sessions⁸ • Live Oak School District, 6 classrooms/ 9 sessions • YWCA 2 classrooms/ 4 sessions • Gault Elementary, 1 classroom/ 1 session • Community Bridges Child Development, 1 classroom / 1 session <p>Lead Teachers⁹ in classrooms were SEEDS –trained: -PreK teachers all with Site Supervision Permit. -TK teachers, all with Multi-Subject Credential</p> <ul style="list-style-type: none"> • Reading Corps Replication pre-k coaching & assessment model • SEEDS of Early Learning <ul style="list-style-type: none"> o Big 5 Early Literacy skills (<i>conversation & oral language, alphabet knowledge, book & print skills, phonological awareness, vocabulary & background knowledge.</i>) o Relationship-based (<i>sensitive, encouraging, educational, develop by doing/ modeling, self-esteem</i>) • Raising a Reader (RAR) book bag program 	<p>F5SC: AmeriCorps member recruitment, screening, interviewing, enrollment, coordination of trainings and all program expectations with PCA, Reading Corps and program partners.</p> <p>Reading Corps Member Training/ Professional Development/ Data Driven Decision-making meetings from various providers. ~ 170 hours</p> <ul style="list-style-type: none"> - 4-day AmeriCorps Orientation (Sept) & Active Citizenship Training (March), and Life After AmeriCorps (April) - 3-day Reading Corps Institute (Sept) - 2 hr. Raising a Reader Orientation (Sept) - 4 hr. Santa Cruz Reading Corps Orientation - 8 hr. SEEDS Training: Response to Intervention (October) - 8 hr. SEEDS Training: Progress Monitoring (November) - 4 hr. "Challenging Behaviors" training by First 5 - 4 hr. "Child behavior management" trained by First 5 - 24 hr. SEEDS of Early Learning sessions (Sept-Feb.) - 2 hour/month "Monthly Meetups" with RC members (Oct-May) - Approximately 18 hours of IGDIs assessment practice - Data team meetings twice a year - 8 hours PCA Leadership training (Spring) <p>Reading Corps Tutors are embedded in preschool and TK sessions with hours ranging from 3-6 hours of instruction per session per day, 5 days per week. They provide:</p> <ul style="list-style-type: none"> - daily whole classroom SEEDS of Early Learning literacy strategies in English (Tier 1) - small groups (Tier 2) instruction 5-10 minutes daily - RTI intervention strategies for 5-7 children in small groups (Tier 2) or one-on-one (Tier 3). - One-on-one tutoring (Tier 3) 3-5 minutes daily - assess all students using IGDIs and FAST 3x/yr. - monitor progress of students identified for Tier 2 or 3 monthly, and enter progress into online data management tool (edSpring/ RCDMS) <p>28 Lead Teachers⁶ integrate Reading Corps program expectations and SEEDS of Early Learning Strategies into the literacy- and math-rich schedule in coordination with literacy tutors, coaches, First 5 staff and district administration. They review and address Early Language and Literacy Classroom Observation Tool (ELLCO) standards.</p> <p>2 Literacy Coaches (each coach supports 10 tutors)</p> <ul style="list-style-type: none"> - participate in trainings, meet-ups, and data review team meetings; - conduct Pre- and Post-ELLCO assessment in the fall and spring for each classroom - Observe assigned classrooms 2x/mo. - Provide tutor coaching 2x/mo. (total 6-9 hours for each tutor) - Check tutors' integrity on all assessments, literacy strategies and interventions. <p>Master Coach</p> <ul style="list-style-type: none"> - Provides SEEDS of Early Learning training - Facilitates data review with literacy coaches, lead teachers, and tutors 2x/year for instructional decisions. - Observes and coaches Literacy coaches and tutors monthly - Enters tutor integrity checks into an online database system (Quickbase) <p>All children receive Raising a Reader books to take home weekly.</p>	<p>18⁷ trained AmeriCorps members each engaged in a minimum of 900 hours of literacy tutor activities (Sept-May)</p> <p>33 Preschool and TK Sessions with enriched literacy environments and activities demonstrated by ELLCO ratings on 19 measures</p> <p>~700 children per year received high quality preschool and TK experiences</p> <ul style="list-style-type: none"> ▪ attended at least 3 hours in literacy enriched program and engaged in Tier 1 instruction ▪ assessed with Individual Growth & Development Indicators (IGDI) and FAST assessments 3x/year ▪ 5 -7 children per session receive Tier 2&3 interventions daily. 	<p>Increased early literacy skills as measured by the IGDIs, FAST in:</p> <ul style="list-style-type: none"> ▪ conversation skills ▪ vocabulary ▪ book and print rules ▪ visual discrimination ▪ phonological awareness ▪ early writing & alphabetic knowledge

⁶ There may be multiple teachers in a classroom

⁷ Plus 2 additional members who left in the winter were not replaced

⁸ One session equals one cohort of children

⁹ Lead Teachers signed Lead Teacher Agreements with the Santa Cruz Reading Corps

Appendix 2: Evaluation Plan

Appendix 2: Evaluation Plan

Outcome	Indicators	Data Collection Methods & Tools	Frequency/Schedule of Data Collection	Analytical Methods
Increased Early Literacy	<ol style="list-style-type: none"> 1. Picture naming 2. Rhyming 3. Alliteration 4. Letter naming 5. Letter sounds 	IGDI	<p>All children in the 11 qualifying ½ day programs classes 3x/year;</p> <p>Tier 2 and Tier children every 4 weeks.</p> <p>First benchmark assessment last week in Sept. or first week in Oct.</p>	<p>Verification of group comparability by age, primary language, ethnicity, gender. Use t-test and chi-square analyses to determine whether the differences are significant. Account for any significant site differences for these variables in subsequent analyses. A univariate linear model will be used to analyze group differences for IGDI and FAST scores. A multivariate linear model will be used to further account for significant site differences as determined by preliminary analyses, as well as potential interactions of group response with the covariates.</p>
Comparability of Sites	<p>All site teachers have been SEEDs trained.</p> <p>Sites attain average ELLCO Scores of 3.4 or greater</p>	ELLCO	Fall and Spring Each Year	Descriptive statistics of site ELLCO scores.