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Outcome Evaluation of the Minnesota Reading Corps PreK Program

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This report represents the work and perspectives of the authors and is the product of professional research. It does not represent the position or opinions of CNCS, the federal government, or the reviewers.

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Executive Summary

Minnesota Reading Corps is the largest AmeriCorps State program in the country. Its mission is to help every Minnesota child become a proficient reader by the end of third grade. To meet this goal, the Minnesota Reading Corps and its host organization, ServeMinnesota Action Network, engages a diverse group of AmeriCorps members to provide evidence-based literacy enrichment and tutoring services to preschool (PreK) students and at-risk Kindergarten through third grade (K-3) elementary school students.

This report, commissioned by the Corporation for National and Community Service (CNCS), describes the results of a quasi-experimental design (QED) outcome evaluation of 1,534, 3-, 4-, and 5-year old PreK students who attended either a Minnesota Reading Corps PreK program site or a comparison site during the 2013-2014 school year. Students were enrolled at 25 Minnesota Reading Corps PreK sites and 25 comparison PreK sites matched to each Minnesota Reading Corp on specific site-level characteristics. The goal of the outcome evaluation was to determine the effects of the Minnesota Reading Corps program on PreK students' emergent literacy skills.

Key Study Findings

PreK students in the Minnesota Reading Corps program achieved significantly higher emergent literacy assessment scores by the end of the school year than did students enrolled at matched-comparison sites.

The 4- and 5-year old students at Minnesota Reading Corps PreK sites outperformed students at matched-comparison sites on *all five* emergent literacy outcomes assessed: letter sound and letter name fluency (alphabet knowledge), rhyming and alliteration fluency (phonological awareness), and picture name fluency (vocabulary). The effect sizes associated with these differences were not only significant, but substantial in magnitude. Further, 4- and 5-year old Minnesota Reading Corps PreK students met or exceeded end of school year targets for all five emergent literacy outcomes, suggesting that they were Kindergarten-ready on these critical skills.

Three-year old students at Minnesota Reading Corps PreK sites outperformed students at matched-comparison sites on two of four emergent literacy outcomes measured: rhyming fluency (phonological awareness) and picture name fluency (vocabulary). The effect sizes associated with these differences were not only significant, but substantial in magnitude. Three-year old students' scores on the remaining two outcomes, letter name recognition (alphabet knowledge) and alliteration fluency (phonological awareness), grew significantly during the school year, but not significantly more than students in comparison classrooms. The results suggest that 3-year old students enrolled in Minnesota Reading Corps PreK classrooms make meaningful growth in key emergent literacy outcomes associated with later reading comprehension.

The Minnesota Reading Corps PreK program was equally effective for PreK students regardless of gender, race/ethnicity or Dual Language Learner (DLL) status.

Students from all subgroups examined produced significant growth in emergent literacy outcomes regardless of gender, race/ethnicity, or DLL status. In instances where statistically significant differences were found, students at Minnesota Reading

Corps PreK sites traditionally at-risk for academic failure (i.e., DLLs, non-White students) grew more over the course of the year than similar types of students at comparison sites.

The Minnesota Reading Corps PreK program was effective across multiple sites and site types; thus, the program is highly replicable in multiple preschool settings.

The Minnesota Reading Corps PreK program was consistently effective across the individual sites where the students received program services, regardless of the type of school setting in which the program was implemented. The lack of school-level effects on student outcomes validates the Minnesota Reading Corps' approach to training, coaching and supervision.

About the Minnesota Reading Corps

The Minnesota Reading Corps program was started in 2003 to provide emergent literacy enrichment and tutoring to students in four Head Start programs. In 2005, it expanded to serve elementary school students in Kindergarten through third grade (K-3). Today, the Minnesota Reading Corps is the largest AmeriCorps State program in the country. The core activities of the program, and its host organization, ServeMinnesota Action Network, are to recruit, train, place and monitor AmeriCorps members who implement evidence-based literacy interventions for at-risk K-3 students and preschool children.

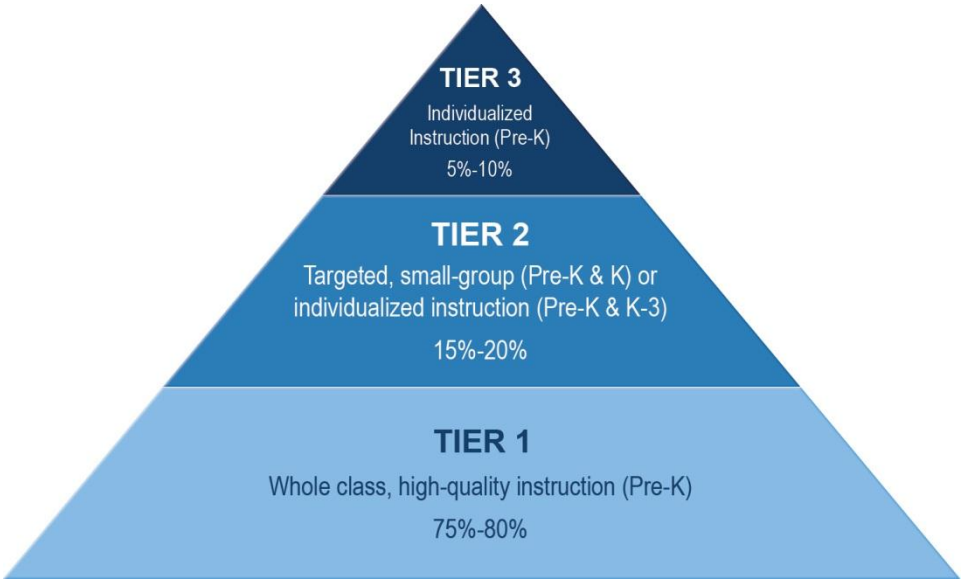
AmeriCorps members in the Minnesota Reading Corps program serve in school-based settings to implement Minnesota Reading Corps literacy enrichment strategies and conduct interventions with PreK-3 students using a Response to Intervention (RtI) framework. The key features of the Minnesota Reading Corps RtI framework are:

- Clear literacy targets at each age level from PreK through grade 3
- Benchmark assessment three times a year to identify students eligible for one-on-one or small group interventions
- Scientifically based interventions
- Frequent progress monitoring during intervention delivery
- High-quality training and coaching in program components, and literacy assessment and instruction

In the RtI framework, data play the key roles of screening students' eligibility for services and then monitoring students' progress towards achieving academic goals (i.e., targets). The Minnesota Reading Corps screens students for program eligibility three times a year (i.e., Fall, Winter, Spring) with two sets of grade-specific, literacy-focused general outcome measures (i.e., IGDI 1.0 for PreK and FAST for K-3) that possess criterion-referenced grade- and content-specific performance benchmarks. Program staff use scores from these general outcome measures to categorize students into one of three possible tiers (i.e., proficiency levels; see **Figure 1**): Tier 1 students score at or above benchmark and benefit from typical classroom instruction (75-80% of students score in this category); Tier 2 students score below benchmark and require specific supplemental interventions until they meet benchmarks (15-20% of students fall into this category); and Tier 3 students require intensive intervention provided by

a special education teacher or literacy specialist and often have individualized educational plans (5-10% of students qualify for this category).[1]

Figure 1. Minnesota Reading Corps Response to Intervention Tiers



The Minnesota Reading Corps PreK program includes both an immersive "push-in" component, where members provide whole-class literacy enrichment for all students (i.e., Tier 1), as well as targeted small group and one-to-one component, where members provide more individualized interventions to students struggling with emergent literacy skills (i.e., Tiers 2 and 3). The PreK program focuses on integrating the "Big Five" Essential Early Literacy Predictors outlined by the National Early Literacy Panel (2008)[2] into all aspects of the daily classroom routine. The "Big Five" for preschool students include: 1) conversational skills, 2) vocabulary and background knowledge, 3) book and print rules, 4) phonological awareness (i.e., rhyming and alliteration), and 5) alphabet knowledge (i.e., letter name recognition and letter sound correspondence). Classroom teachers and AmeriCorps members are tasked with creating a Literacy Rich Classroom using evidence-based practices assessed in the ELLCO (Early Language & Literacy Classroom Observation) tool and implementing a Literacy Rich Schedule. In addition, AmeriCorps members serving in the PreK program are responsible for enacting the SEEDS of Emergent Literacy,[3] which provides both members and teachers with specific strategies to enhance literacy instruction for *all children* in the classroom.

[1] The percentage of children testing into Tiers 1-3 are national estimates based on the literature: http://www.rtinetwork.org/essential/tieredinstruction/tiered-instruction-and-intervention-rti-model; http://www.hanoverresearch.com/insights/developing-a-maximum-impact-response-to-intervention-program/?i=k-12-education; Hoover, J.J., & Patton, J.R. (2008). The role of special educator in a multi-tiered instructional system. *Intervention in School and Clinic*, 43(4), 195-202.

[2] National Early Literacy Panel. (2008). *Developing early literacy: Report of the National Early Literacy Panel.* Washington, DC: National Institute for Literacy.

[3] Horst, K., & Passe, A. (2004). *Creating Literacy Rich Classrooms for Preschool Children (Ages 0-5)*. Presented at the 2004 CEED Symposium. Minneapolis, MN.

Outcome Evaluation Methodology

The PreK outcome evaluation is one of several complementary studies of the Minnesota Reading Corps program: a process assessment of program implementation in 20 PreK and K-3 sites;[4] a Phase II process assessment focused solely on the PreK program[5]; a randomized controlled trial (RCT) impact evaluation of the program on K-3 students' literacy outcomes; [6] and a survey of AmeriCorps members. The PreK outcome evaluation focused on the following three research questions:

1. What is the effect of the Minnesota Reading Corps program on student literacy outcomes?
2. Does the effect on literacy outcomes vary by student characteristics/demographics?
3. Do effects on literacy outcomes vary by site/school?

The methodology used was informed by the 2008-2009 and 2010-2011 annual Minnesota Reading Corps evaluations.[7]

School and Student Selection

The site selection process was designed to ensure representation of the diverse schools participating in the Minnesota Reading Corps PreK program. Therefore, site selection was both purposive and involved a multi-step stratified sampling process. As it was not our intention to assess how well sites adopted/executed the program during their *first* year of participation, the site sampling process began by limiting the sampling frame to only sites that had fully implemented the Minnesota Reading Corps PreK program for at least one year. Next, to ensure geographical diversity, sites were stratified by urbanicity (i.e., urban, suburban, and rural), institution type (i.e., public preschool, community-based program and Head Start center), and student ages served within a classroom (i.e., 4- and 5-year old students only or a mix of 3-, 4-, and 5-year old students). A total of 40 sites were selected, using Probability Proportional to Size (PPS), whereby larger sites based on student enrollment (defined as the number of PreK students served by the Minnesota Reading Corps during the 2012-2013 school year) had a higher probability of selection. Using PPS ensured a statistically adequate sample size to conduct the PreK outcome evaluation. It is important to note that while the Minnesota Reading Corps program staff encouraged sites to participate, participation in the evaluation was voluntary. In the end, 39 sites agreed to participate in the PreK outcome evaluation during the 2013-2014 school year.[8]

To identify comparison sites for the PreK QED, the study followed U.S. Department of Education's Institute of Education Sciences' (IES) What Works Clearing House (WWC) guidelines for a QED that "*Meets Evidence Standards with Reservations.*" PreK programs were eligible for consideration for the comparison group if: 1) the program had no history of implementing the Minnesota Reading Corps program; and 2) the program staff had not been trained in the SEEDS of Emergent Literacy

[4] Hafford, C., Markovitz, C., Hernandez, M, et al. (February 2013). *Process Assessment of the Minnesota Reading Corps Program.* (Prepared under contract to the Corporation for National and Community Service). Chicago, IL: NORC at the University of Chicago.

[5] Hafford, C., Markovitz, C., Hernandez, M, et al. (October 2014). *Phase II Process Assessment of the Minnesota Reading Corps Program.* (Prepared under contract to the Corporation for National and Community Service). Chicago, IL: NORC at the University of Chicago.

[6] C., Markovitz, C., Hernandez, M, et al. (March 2014). *Impact Evaluation of the Minnesota Reading Corps K-3 Program.* (Prepared under contract to the Corporation for National and Community Service). Chicago, IL: NORC at the University of Chicago.

[7] Bollman, K. & Silberglitt, B. (2009). *Minnesota Reading Corps Final Evaluation 2008-2009*. Minneapolis, MN: MRC.; Bollman, K. & Silberglitt, B. (2011). *Minnesota Reading Corps Final Evaluation 2010-2011*. Minneapolis, MN: MRC.

[8] The school that did not participate referenced staff shortages as the reason.

approach.[9] From this group of eligible PreK sites, a comparison group was identified by matching the site to a Minnesota Reading Corps PreK program site on a select group of educationally important pre-intervention characteristics[10] (i.e., urbanicity, institution type, classroom composition of student ages, percentage of students eligible for FRPL,[11] and percentage of students who were DLLs). Additional secondary variables were also considered when matching program and comparisons sites (e.g., site enrollment, instructional time, and student to teacher ratio), though they were primarily used to sharpen the match when multiple potential match sites were identified. The final set of variables is provided in **Table 1**.

Table 1. PreK QED Matching Variables

Order	Variable	Description
Primary Matching Variables		
1	Urbanicity	Urban, suburban or rural
2	Institution Type	Public preschool, Head Start Center, Community-based program
3	Classroom Composition of Student Ages Served	Only 4/5 year olds or mixed 3,4 and 5 year olds
4	Socio-Economic Status (SES)	% students eligible for Free or Reduce Price Lunch (FRPL) and/or % poverty of families with children in the census tract within which the site is located
5	Dual Language Learner (DLL) Status	% of students who do not speak English as a first language.
Secondary Matching Variables		
6	Site Enrollment	Number of students enrolled in the PreK program at the site.
7	Instructional Time	Number of hours of instruction per week (e.g., half vs. full day; number of days per week)
8	Student to Teacher/Adult Ratio	The number of students for every teacher or adult in the classroom.

Once potential comparison sites were identified, the evaluation team approached site administrators to gain their participation in the study through a prescribed recruitment process. Sites typically agreed to participate because they would benefit from obtaining access to the assessment data we collected on their students upon completion of the study. In the end, the study team was able to match 29 schools to Minnesota Reading Corps programs and recruit 25 sites to participate in the study. Thus, 25 pairs (25 program sites and 25 comparison sites) for a total of 50 sites participated in the outcome evaluation. The total student sample size was determined by the number of students enrolled in a PreK classroom. If a comparison site had more classrooms and students than was required to achieve sufficient statistical power (i.e., 30 students across two classrooms), the comparison site classrooms that best mirrored the matched-Minnesota Reading Corps program classroom on amount of instructional time (i.e., days per week, hours per day) were selected.

[9] Since SEEDS is an integral part of the Minnesota Reading Corps program, including SEEDS trained sites in the evaluation would have eliminated the possibility of detecting an effect of this critical program element.

[10] These variables were based on WWC recommendations, administrative data collected by Minnesota schools at the time, the literature on predictors of preschool emergent-literacy outcomes, and consultation with the project's Technical Working Group (TWG).

[11] A measure of household poverty and socio-economic status

Data Collection

The evaluation team employed two methods of data collection for the PreK outcome evaluation: 1) administrative data retrieval from program sites and 2) original data collection from comparison sites. Because the Minnesota Reading Corps PreK program collects Fall, Winter, and Spring IGDI benchmark data from all PreK students in program classrooms, NORC requested access to all 2013-2014 school year assessment and demographic data from the 25 Minnesota Reading Corps PreK sites selected for participation in the outcome evaluation. This administrative data served as the primary outcome data for the program sites.

NORC was responsible for collecting equivalent IGDI data three times a year (Fall, Winter, Spring) from PreK student at the comparison sites. In order to collect this data, the evaluation team sent field testers, who would be responsible for assessing students at comparison sites, to the same Minnesota Reading Corps training as that attended by AmeriCorps members. This process ensured that the field testers: 1) used the same IGDI data collection instruments for collecting student-level benchmarks from comparison site students as those used to collect data from students at the Minnesota Reading Corps program sites; and 2) received the same standardized training in assessment administration and scoring as the AmeriCorps members. This common use of instrumentation and training ensured commonality of assessment practices across both program and comparison sites.

Analysis

The student-level IGDI assessment and demographic data NORC collected from comparison sites were combined for analysis with de-identified IGDI data from the Minnesota Reading Corps administrative dataset. The resulting analytic dataset contained all the assessment and demographic data collected from comparison sites and existing data extracted for participating Minnesota Reading Corps PreK program sites.

As discussed above, each Minnesota Reading Corps program site was paired with a comparison site on several key variables. During data analysis, these variables were equated using statistical controls so as to adjust for pre-intervention differences among groups. This produced a "site pair," comprised of one Minnesota Reading Corps program site and one matched comparison site. The analysis was conducted separately for 3-year-old students and for 4- and 5-year-old students due to several factors: 1) 3-year-old children are developmentally distinct from 4- and 5-year old children; 2) there is more variability in prior exposure to PreK instruction among 4- and 5-year old students than among 3-year old students; and 3) the assessments used to measure letter name fluency differed by age group.

Three specific and separate analytic approaches were used to address the three major research questions of the evaluation:

1. To assess the average treatment effect of the Minnesota Reading Corps PreK program (RQ1), the evaluation team examined differences within each site pair by each student age group by employing an ANCOVA (Analysis of Covariance) regression using fixed effects for site pairs. The ANCOVA regression predicted the Spring IGDI benchmark score (outcome) as a function of the student-level covariates, namely the Fall benchmark score and age

(i.e., 3-year old and 4/5-year old), in addition to the site-level Minnesota Reading Corps PreK program participation variable (indicator).[12]

2. To determine whether the effect on emergent literacy outcomes varied as a function of student demographics (RQ2), the evaluation team employed two types of subgroup analyses.[13] First, specific covariates and moderators were added to the ANCOVA model and jointly tested to determine if there were significant differences in effects across major subgroups. The second analysis involved subdividing the data by major subgroup and applying the same analysis as for the entire sample. Subgroups were defined based on characteristics provided at baseline and each level was determined by individual characteristics, including gender, race/ethnicity, and Dual Language Learner (DLL) status.

3. Given the diversity of early childhood education programs (e.g., curricula, attendance time, student/family demographics, funding source, etc.), it was unclear if and how effective the Minnesota Reading Corps PreK program might be at different sites and site types. To estimate whether program effects varied by site (RQ3), the evaluation team conducted two analyses: 1) a subgroup analysis on site type (i.e., public preschool or Head Start Center[14]) and 2) an intraclass correlation (ICC) analysis to assess site pair-level effects. The site type subgroup analysis estimated the differential impact of the Minnesota Reading Corps PreK program in public preschools and Head Start centers. The ICC analysis examined whether there was variation in the effect of the program across pairs of sites (program vs. comparison).

Findings and Conclusions

Below, the evaluation team offers our conclusions based on the study findings and organizes them by the three major research questions, followed by final thoughts on the implications of these findings for the future of the Minnesota Reading Corps PreK program.

Research Question #1: What is the effect of the Minnesota Reading Corps program on student literacy outcomes?

The results of our analysis showed that preschool students who attended Minnesota Reading Corps PreK classrooms achieved significantly higher emergent literacy assessment scores by the end of the school year than did students who did not attend a Minnesota Reading Corps classroom. The Minnesota Reading Corps PreK program had statistically significant effects across all five IGDI outcome measures, *letter sound fluency, rhyming fluency, letter name fluency, picture name fluency ,and alliteration fluency,* for 4- and 5-year old students between Fall benchmark (September 2013) and Spring benchmark (May 2014) . In addition, medium to large effect sizes were found on each measure, ranging from .40 to .72, indicating that the program has a comprehensive, positive effect on students' emergent literacy skills. Despite the substantially smaller sample size for 3-year old

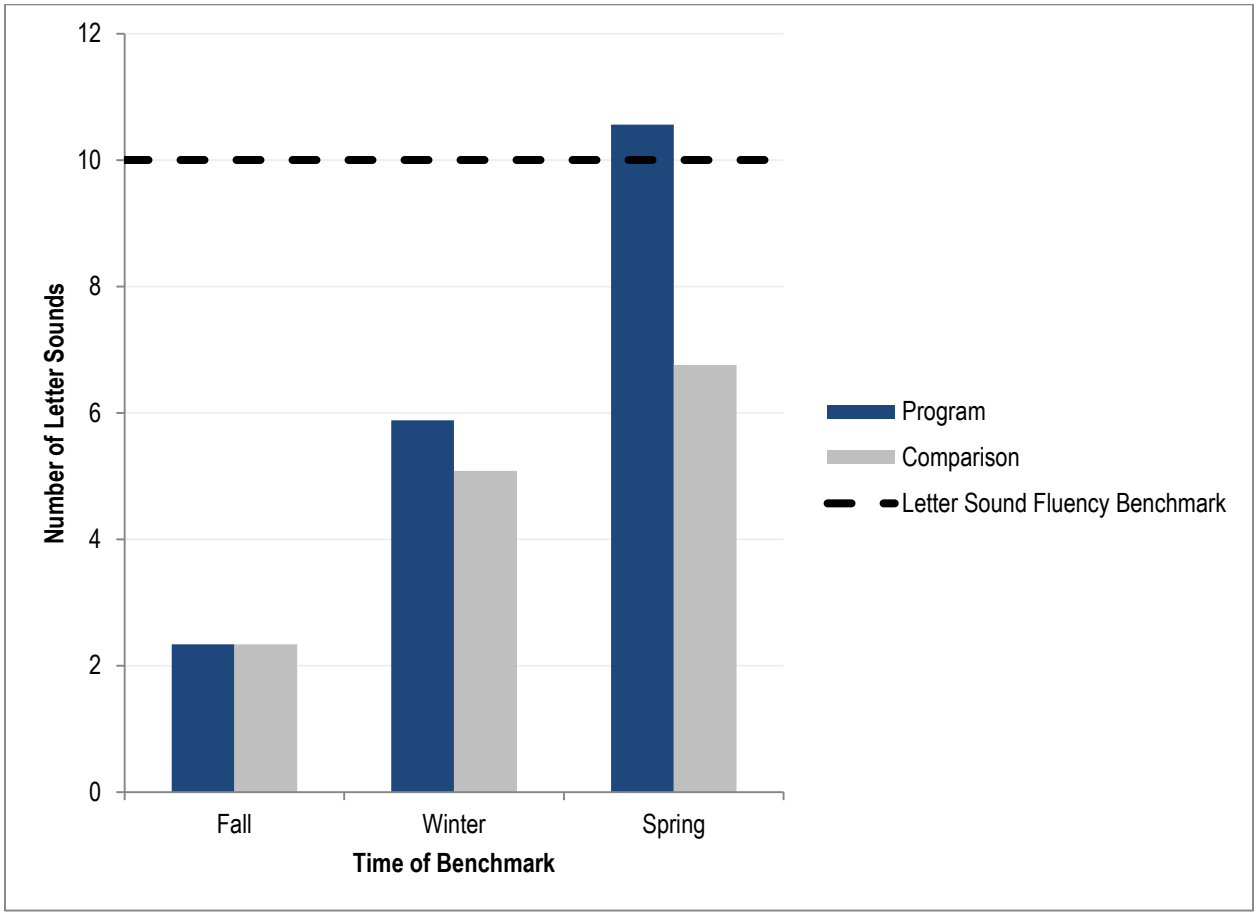
[12] The analysis team also conducted an analysis of the Winter IGDI benchmark scores, and the results are available in Appendix B to this report.

[13] Subgroup analyses were only conducted on the 4- and 5-year old student sample. They were not conducted on the 3-year old student sample due to small sample sizes.

[14] Head Start Centers restrict enrollment to low-income households (i.e., at or below federal poverty level for household size). Thus, enrollment in a Head Start Center is a proxy for lower socio-economic status (SES).

students, the Minnesota Reading Corps PreK program was found to have a significant and medium to large effects on 3-year old PreK students' *rhyming fluency* and *picture name fluency* scores between Fall and Spring benchmark. Although growth was also found for 3-year old students on the *letter name recognition* and *alliteration fluency* outcome measures, 3-year old PreK students in Minnesota Reading Corps PreK classrooms did not attain significantly higher scores on these measures at Spring benchmark than PreK students in comparison classrooms.

Figure 2. Example of differential growth in 4- and 5-year old PreK program and comparison students' emergent literacy outcomes: Letter Sound Fluency



Overall, the results of the student outcome analysis revealed that the Minnesota Reading Corps PreK Program is achieving its goal of creating Kindergarten–ready 4- and 5-year old students, as measured against the IGDI Spring benchmarks. Of particular interest was the large, significant effect that the Minnesota Reading Corps program produced in the growth in children's vocabulary, as measured by picture name fluency. Vocabulary is one of the strongest predictors of later reading comprehension. The Minnesota Reading Corps PreK program's attention to not only decoding skills (i.e., letter name recognition and letter sound correspondence) but also oral language skills (i.e., vocabulary) is a key program feature and likely a primary reason for the demonstrated effectiveness of the program. The contextualized language and literacy instruction emphasized by the program, as

best evidenced by extended adult-child discourse and rich dialogic reading sessions, is a proven method for growing children's emergent literacy skills.

Research Question #2: Does the effect on literacy outcomes vary by student characteristics/demographics?

For the most part, students from all subgroups examined produced significant growth in emergent literacy outcomes regardless of gender, race/ethnicity, or DLL status. Of note, students typically at risk for not being Kindergarten-ready, non-Whites and Dual Language Learners, posted significantly greater growth in vocabulary, as measured by picture name fluency, at Minnesota Reading Corps PreK sites than at comparison sites. In contrast to students at program sites, the vocabulary of non-White students and DLL students at comparisons sites did not grow significantly from Fall to Spring. This finding implies that the program elements that together comprise the Minnesota Reading Corps PreK program have a significant and meaningful impact on a critical skill (vocabulary) at program sites that is otherwise unaffected at comparison sites.

Research Question #3: Do effects on literacy outcomes vary by site/school?

The Minnesota Reading Corps program appears to be consistently effective no matter the type of preschool setting in which the program is implemented, either public school or Head Start center. Students enrolled at both types of preschools evidenced greater growth in emergent literacy outcomes at Minnesota Reading Corps PreK program sites than comparison sites. Of note, students at Minnesota Reading Corps Head Start centers achieved significantly greater growth on letter sound fluency and alliteration fluency than their peers at comparison Head Start centers who did not improve on these measures during the school year. These results suggest that not only is the Minnesota Reading Corps PreK program effective in both public schools and Head Start centers, but that the program may be particularly effective in developing some emergent literacy skills for students enrolled in Head Start centers.

Final Thoughts

Overall, the results of this study show that the Minnesota Reading Corps PreK program is an effective model for improving preschool students' emergent literacy skills. Thus, the Minnesota Reading Corps PreK program is contributing to the nationwide goal of improving 3rd grade reading proficiency by preparing preschool-aged students to be kindergarten-ready.

The Minnesota Reading Corps PreK program's comprehensive scope, including both whole-class instructional strategies and differentiated interventions, results in class-wide impacts. The coordination between the two forms of instruction is likely a key source of the accelerated growth we observed in students' emergent literacy outcomes. As outlined in the *Phase II Process Assessment,*[15] the Minnesota Reading Corps PreK program provides a common infrastructure for coordinated, intentional instruction through the Literacy Rich Schedule, a common pedagogy for interacting with PreK students via SEEDS, and proven strategies for embedding language and literacy instruction at times during the school day that are often overlooked (e.g., arriving at the beginning of the day, lining up for bathroom breaks or the bus, transitioning between circle time and choice time).

[15] Hafford, C., Markovitz, C., Hernandez, M.W., Diaconis, A., Estrera, E., & Muyskens, P. (2014). *Phase II Process Assessment of the Minnesota Reading Corps PreK Program.* (Prepared under contract to the Corporation for National and Community Service). Chicago, IL: NORC at the University of Chicago.

Furthermore, the program is most effective when all adults in a classroom coordinate their practice; therefore, it is critical that the lead teacher understand and fully commit to the Minnesota Reading Corps PreK model. The Minnesota Reading Corps program's use of a multi-layered supervisor structure, including site-based Internal Coaches and program-provided Master Coaches, effectively supports the implementation of such a comprehensive program. In sum, the complete Minnesota Reading Corps PreK program, implemented with fidelity, is both highly replicable and effective in improving diverse PreK students' emergent literacy outcomes.

I. Introduction

Minnesota Reading Corps is a statewide initiative with a mission to help every Minnesota child become a proficient reader by the end of third grade. The Minnesota Reading Corps program engages a diverse group of AmeriCorps members to provide literacy enrichment and tutoring services to preschool children (PreK) and at-risk Kindergarten through third grade (K-3) elementary school students. As of the 2013-2014 school year, more than 1,100 AmeriCorps members[16] implemented the program in 712 schools or sites[17] and 213 school districts across the state of Minnesota.[18]

This report, funded by the Corporation for National and Community Service (CNCS), describes the findings of a quasi-experimental design (QED) outcome evaluation of 1,534 three-, four-, and five-year old students who attended either a Minnesota Reading Corps PreK program sites or a comparison site during the 2013-2014 school year. Students were enrolled at a representative sample of 25 Minnesota Reading Corps programs and 25 comparison sites matched to each Minnesota Reading Corps preschool or Head Start program on specific site-level characteristics. The goal of the outcome evaluation was to determine the effects of the Minnesota Reading Corps program on preschool students' emergent literacy skills.[19]

The PreK outcome evaluation is one of several complementary studies of the Minnesota Reading Corps program: a process assessment of the Minnesota Reading Corps program in 20 PreK and K-3 sites (completed in Spring 2013)[20] a randomized controlled trial (RCT) impact evaluation of the Minnesota Reading Corps K-3rd program (Spring 2014)[21] and a survey of AmeriCorps members (Fall 2013). In addition to these studies, a Phase II process assessment focusing specifically on the Minnesota Reading Corps PreK program was completed in Fall 2014, the results of which were intended to inform the findings presented in this report.

During a feasibility study for designing the Minnesota Reading Corps evaluation, we concluded that the random assignment of individual PreK students to program and comparison groups within a school was not feasible. The Minnesota Reading Corps PreK program is designed to serve an entire classroom of students and transform teachers' instructional practices, which affects all students. As such, it was not possible to randomly assign either students within classrooms or classrooms within schools to

[16] 324 members served in the PreK program during the 2013-2014 school year; 5,174 Minnesota Reading Corps members have served from 2003 through 2014.

[17] According to the Minnesota Department of Education (MDE), during the 2013-2014 school year, 1618 public schools served grades K-12. Of those schools, 933 offered PreK services. The total number of preschools in the state of Minnesota (i.e., public schools and non-public schools) was not available. http://w20.education.state.mn.us/MDEAnalytics/Summary.jsp

[18] According to MDE, during the 2013-2014 school year, there were 328 public operating elementary & secondary independent school districts, 3 intermediate school districts, and 150 charter schools (which are considered public school districts in Minnesota).

[19] Specifically, letter sound fluency and letter name recognition or fluency (alphabet knowledge), rhyming and alliteration fluency (phonological awareness), and picture name fluency (vocabulary)

[20] Hafford, C., Markovitz, C., Hernandez, M, et al. (February 2013). *Process Assessment of the Minnesota Reading Corps Program.* (Prepared under contract to the Corporation for National and Community Service). Chicago, IL: NORC at the University of Chicago.

[21] C., Markovitz, C., Hernandez, M, et al. (March 2014). *Impact Evaluation of the Minnesota Reading Corps K-3 Program.* (Prepared under contract to the Corporation for National and Community Service). Chicago, IL: NORC at the University of Chicago.

program and comparison conditions.[22] Therefore, the best alternative, a rigorous QED, was employed. The Minnesota Reading Corps PreK outcome evaluation focuses on the following research questions:

1. What is the effect of the Minnesota Reading Corps program on student literacy outcomes?
2. Does the effect on literacy outcomes vary by student characteristics/demographics?
3. Do effects on literacy outcomes vary by site/school?

To address these questions, we begin in Chapter II by presenting a brief overview of the Minnesota Reading Corps program and its role in the recruitment, training, placement and monitoring of AmeriCorps members as they implement the program in preschool and elementary school settings. We then describe the PreK component of the Minnesota Reading Corps program (which is the focus of this evaluation), its multi-layered supervisory structure, and the Summer Training Institute. Chapter III then provides information on the outcome evaluation's methodology for selecting sites to participate in the study, procedures for matching Minnesota Reading Corps (program) and comparison sites, data collection and use of program data, and analysis of findings.

This background information sets the context for the presentation of findings from our analyses of assessment data from the Minnesota Reading Corps PreK program in Chapter IV. These findings are based on a comparison of Spring outcome scores for students attending a Minnesota Reading Corps program site and similar students enrolled in a comparison program site. Our examination of the program outcomes also includes analyses of key subgroups, including gender, race/ethnicity, and Dual Language Learner (DLL) status. We did not examine students by Free or Reduced Price Lunch (FRPL) eligibility, which is a measure of socio-economic status, because these data were either not collected or considered confidential; however, the majority of our sample attended either a Head Start program (100% FRPL eligible) or public schools with high percentages of elementary school-aged children with who were FRPL eligible. Therefore, it is reasonable to assume that the majority of the children in our study would likely meet eligibility criteria for FRPL. In this chapter, we also examine whether outcomes vary due to the type of site where the intervention took place (i.e., public school or Head Start center).

In addition to the presentation of findings on the study results in Chapter IV, we provide in **Appendix D** a separate analysis of the data tailored to the requirements of the U.S. Department of Education's Institute of Education Sciences' What Works Clearinghouse (WWC). We share the WWC's goal of providing educators with the information they need to make evidence-based decisions. Therefore, we have developed this appendix to specifically demonstrate that our study meets WWC's standards for a QED study that "meets evidence standards with reservations."

We conclude our report in Chapter V by returning to the research questions. The evaluation team addresses whether the Minnesota Reading Corps PreK program appears to have an effect on students' emergent literacy skills and whether there are differential effects by age, gender, race/ethnicity, and/or DLL status based on growth between Fall and Spring benchmark on

[22] In addition to randomizing students or classrooms, another option which was considered was to randomize schools or sites. However, there are not enough new school applicants to the Minnesota Reading Corps program each year to be able to adequately power an impact evaluation where the unit of randomization is schools/sites.

age-appropriate literacy measures. Finally, we discuss the implications of the findings for the Minnesota Reading Corps program. A glossary of terms to assist the reader is provided in **Appendix E**.

II. About Minnesota Reading Corps

A. Statewide Implementation of the Minnesota Reading Corps: 2003-2013

Minnesota Reading Corps is the largest AmeriCorps State program in the country. The goal of the Minnesota Reading Corps is to ensure that students become successful readers and meet reading proficiency targets by the end of the third grade. The Minnesota Reading Corps program was started in 2003 to provide reading and literacy tutoring to children in four preschool (PreK) Head Start programs. In 2005, the Minnesota Reading Corps expanded its program to serve students in Kindergarten through third grade (K-3). The core activities of the Minnesota Reading Corps, and its host organization, ServeMinnesota Action Network, are to recruit, train, place and monitor AmeriCorps members to implement research-based literacy interventions for at-risk preschool children and K-3 students.

The Minnesota Reading Corps is a strategic initiative of ServeMinnesota. ServeMinnesota is the state commission for all AmeriCorps State programs in Minnesota, including the Minnesota Reading Corps, and helps leverage federal, state and private dollars to operate the Minnesota Reading Corps. As a catalyst for positive social change and community service, ServeMinnesota works with AmeriCorps members and community partners to meet critical needs in Minnesota. As a nonprofit organization, it supports thousands of individuals to improve the lives of Minnesotans by offering life-changing service opportunities that focus on education, affordable housing, employment, and the environment. The ServeMinnesota Action Network serves as fiscal host to provide statewide management and oversight for the Minnesota Reading Corps program. The Action Network is a nonprofit organization and serves as a home to incubate, replicate and scale evidence-based AmeriCorps programs that address critical state priorities. In addition, the Saint Croix River Education District (SCRED) and TIES[23] have been funded by ServeMinnesota to conduct an annual evaluation of the Minnesota Reading Corps program.[24]

AmeriCorps members in the Minnesota Reading Corps program serve in school-based settings to implement Minnesota Reading Corps literacy enrichment strategies and conduct interventions with PreK-3 students. Minnesota Reading Corps members serve as AmeriCorps members, bound to the program's call to service. As a direct service program, the Minnesota Reading Corps engages its members in service to work towards the solution of a social issue. In exchange for their service of 1,700 hours a year (full-time) or 900 hours a year (part-time), members receive benefits that include a bi-weekly stipend, student loan forbearance, and an education stipend for the first two years of service.

Minnesota Reading Corps AmeriCorps members are supported by a multi-layered supervisory structure. One or more on-site Internal Coaches mentor members during their year of service, continually monitoring fidelity of program implementation, and ensuring effective tutoring. Internal Coaches are typically specialists, teachers, or curriculum directors employed by the site or school. Expert-level Master Coaches are assigned to each Internal Coach to provide consultation on literacy interventions and assessment, as well as ensure fidelity to the Minnesota Reading Corps model. The Minnesota Reading Corps Program

[23] http://ties.k12.mn.us/

[24] ServeMinnesota 2011, Background document.

Coordinators provide administrative support to individual sites (Principals, Internal Coaches, and Master Coaches) and assist members with their AmeriCorps responsibilities.

In the 2013-14 school year, the Minnesota Reading Corps program's more than 1,100 AmeriCorps members served over 30,000 students in 712 elementary schools, Head Start centers, and preschools, making it the largest AmeriCorps programs in the country. Based on the early success of the Minnesota Reading Corps program, replication is underway in Colorado, Massachusetts, Michigan, Santa Cruz County, CA, Washington, DC, Virginia, Iowa, and North Dakota.

B. Foundational Framework and Staffing Structure in the Minnesota Reading Corps

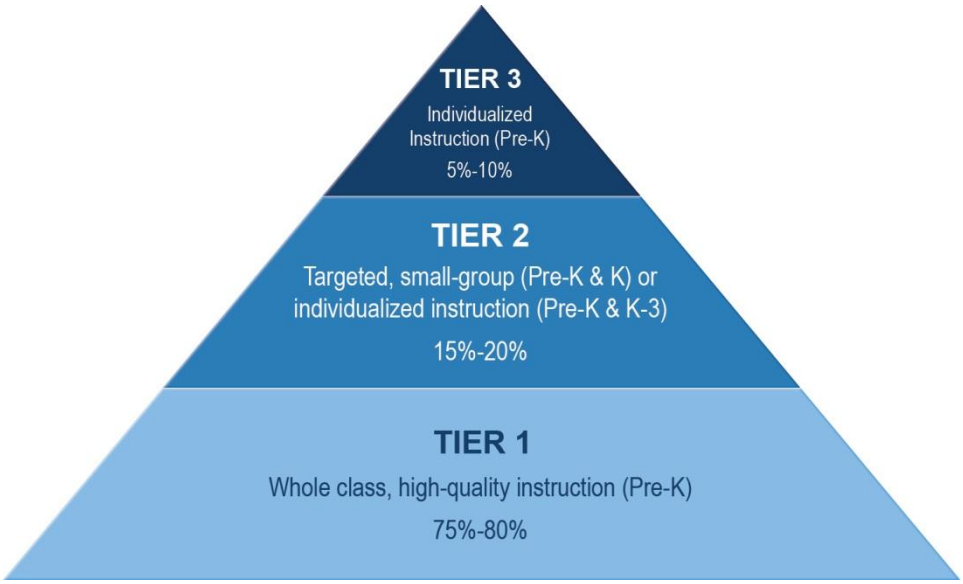
The Minnesota Reading Corps program utilizes a Response to Intervention (RtI) approach to objectively identify and provide additional instructional support to at-risk students. RtI is based on a problem solving approach, which was incorporated into the 2004 Individuals with Disabilities Education Act (IDEA), and has been gaining popularity among educators, policymakers, administrators, teachers, and researchers. The key features of the Minnesota Reading Corps RtI framework are:

- Clear literacy targets at each age level from PreK through grade 3
- Benchmark assessment three times a year to identify students eligible for one-to-one and small group interventions
- Scientifically based interventions
- Frequent progress monitoring during intervention delivery
- High-quality training and coaching in program components, literacy assessment and instruction

In RtI, assessment data play the key roles of screening students' eligibility for additional services and then monitoring students' progress towards achieving academic goals (i.e., benchmarks). The Minnesota Reading Corps screens students for program eligibility three times a year (i.e., Fall, Winter, Spring) with two sets of grade-specific, literacy-focused general outcome measures (i.e., IGDI 1.0 for PreK and FAST for K-3) that possess criterion-referenced grade- and content-specific performance benchmarks. Program staff use scores from these general outcome measures to categorize students into one of three possible tiers (i.e., proficiency levels; see **Figure II.1**): Tier 1 students score at or above benchmark and benefit from typical whole class instruction (75-80% of students score in this category); Tier 2 students score below benchmark and require supplemental intervention until they meet benchmarks (15-20% of students fall into this category); and Tier 3 students require intensive one-to-one intervention provided by a special education teacher or literacy specialist and often have individualized educational plans (5-10% of students qualify for this category).[25]

[25] The percentage of children testing into Tiers 1-3 are national estimates based on the literature: http://www.rtinetwork.org/essential/tieredinstruction/tiered-instruction-and-intervention-rti-model; http://www.hanoverresearch.com/insights/developing-a-maximum-impact-response-to-intervention-program/?i=k-12-education; Hoover, J.J., & Patton, J.R. (2008). The role of special educator in a multitiered instructional system. *Intervention in School and Clinic*, 43(4), 195-202.

Figure II.1. Minnesota Reading Corps Response to Intervention Tiers



The Minnesota Reading Corps PreK program includes both an immersive "push-in" component, where members provide whole-class literacy enrichment for all students (i.e., Tier 1), as well as targeted small group and one-to-one components, where members provide more individualized interventions to students struggling with emergent literacy skills (i.e., Tiers 2 and 3). The Minnesota Reading Corps K-3 program provides one-to-one tutoring where members provide supplemental individualized literacy interventions to primarily Tier 2 students in Kindergarten through third grade. Although the Minnesota Reading Corps program provides both PreK and K-3 interventions to students, the focus of this evaluation is on the Minnesota Reading Corps PreK program. Therefore, the remainder of this report will focus on describing the PreK program and evaluation. As previously mentioned, the findings from a randomized controlled trial (RCT) evaluation of the Minnesota Reading Corps K-3 program were published in Spring 2014.

Overview of PreK Program Literacy Focus and AmeriCorps Members' Role

At the PreK level, the Minnesota Reading Corps program focuses on integrating the "Big Five" Early Literacy Predictors outlined by the National Reading Panel[26] into all aspects of the daily classroom routine. The "Big Five" for preschool students include: 1) conversational skills, 2) vocabulary and background knowledge, 3) book and print rules, 4) phonological awareness (i.e., rhyming and alliteration), and 5) alphabetic knowledge (i.e., letter name recognition and letter sound correspondence). AmeriCorps members are tasked with creating a Literacy Rich Classroom using evidence-based practices assessed in the ELLCO (Early Language & Literacy Classroom Observation) tool, and implementing a Literacy Rich Schedule. Along with implementing classroom-based strategies, members provide targeted individual or small group literacy tutoring for Tier 2 and Tier 3 students

[26] National Early Literacy Panel. (2008). *Developing early literacy: Report of the National Early Literacy Panel.* Washington, DC: National Institute for Literacy.

until they meet program-specified targets that predict end-of-year proficiency. Members implement 5-to 10-minute scripted interventions focused on students' emergent literacy skills.

The Minnesota Reading Corps Literacy Rich Schedule is designed to provide children with daily routines that embed early literacy predictors into fun and meaningful learning. As such, each classroom's day is structured around a Literacy Rich Schedule that is integrated with the school's curriculum. The schedule includes 12 activities, in order: Arrival, Sign-in, Meal Time, Large Group, Daily Message, Repeated Read Aloud, Tier 1 Small Group, Journal (weekly), Choice Time/Active Learning, Tier 2 or Tier 3 Small Group, Big 5 transitions, and Family (through Talk, Read, and Write with Me!). Within and between each scheduled activity, teachers and members strive to integrate Minnesota Reading Corps expected routines, including "Strive for 5" conversations using an overarching theme, functional vocabulary, and "Big 5 Transitions." The Big 5 Transitions occur as children move from one part of the literacy rich schedule to another. Members and teachers engage the children in an activity, such as rhyming games or letter sound songs, focused on one of four emergent literacy skills: oral language, phonological awareness, letter names, and letter sounds.

AmeriCorps members serving in the PreK program are also responsible for enacting the SEEDS of Emergent Literacy,[27] which provides both members and teachers with specific strategies to enhance literacy instruction for *all children* in the classroom. The SEEDS model is interactive, skills-focused and based on current research in early childhood education, child development, emergent literacy, and effective teaching. SEEDS is a relationship-based instructional approach that maps out for teachers five ways to *intentionally* interact with children in order to promote academic growth and social-emotional well-being. SEEDS high quality interactions include the following five elements:

- **Sensitivity:** Look, listen, and ask questions to become aware of each child's needs, thoughts, abilities and feelings;
- **Encouragement:** Use intentional affirmations and positive non-verbal communication to create a shared positive learning environment;
- **Education:** Embed the "Big 5" literacy skills in daily routines (vocabulary, conversation, phonological awareness, book and print rules, and letter knowledge);
- **Development of Skills Through Doing:** Help children explore their world through hands-on learning; and
- **Self-Image Support:** Balance the SEEDS quality interactions to support a child's feeling of being respected and capable.

Within the PreK program, there are different roles for instructional staff and AmeriCorps members. Each PreK classroom has a "lead teacher" (a licensed teacher who is the students' primary instructor) and an AmeriCorps member. Two types of AmeriCorps members may be assigned to a classroom: Educator Corps[28] or Community Corps. Community Corps members are recruited from the community and are embedded into a classroom to collaborate with teaching staff. Educator Corps members are current employees of the service site who receive additional training and accept new responsibilities to become a non-stipend AmeriCorps members. Both Community Corps and Educator Corps members' share the same goal of developing their students'

[27] Horst, K., & Passe, A. (2004). *Creating Literacy Rich Classrooms for Preschool Children (Ages 0-5).* Presented at the 2004 CEED Symposium. Minneapolis, MN.

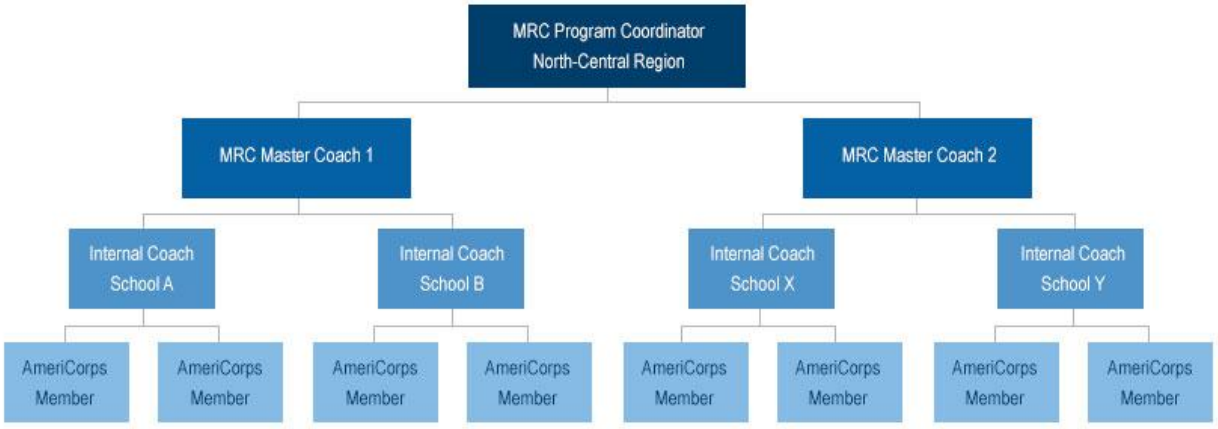
[28] In previous years, Educator Corps members were referred to as Professional Corps members.

emergent literacy skills in preparation for Kindergarten. Their role in the classroom is to provide children with high quality language and literacy learning opportunities by completing assessments, implementing the literacy rich schedule, engaging in SEEDS quality interactions, and conducting Tier 2 and 3 small-group and one-to-one interventions.

Supervisory Staff

The Internal Coaches and Master Coaches play important roles in Minnesota Reading Corps program implementation (see **Figure II.2** for an illustration of the complete Minnesota Reading Corps supervisory structure). The Internal Coach is a school employee who is trained to provide on-site literacy support and oversight to AmeriCorps members serving as literacy tutors at the site. In order to ensure fidelity to the Minnesota Reading Corps model, the Internal Coach conducts integrity observations of members as they assess students (three times per year) and implement interventions with students (once a month). The Internal Coach provides the member with feedback for continual improvement based on these observations. The Internal Coach also ensures that the member is accurately reporting student data in edSpring, an internet-based data entry system for storing progress monitoring data on students. Throughout the school year, the Internal Coach works with assistance from the Master Coach to select appropriate interventions for each student and to determine if students are ready to exit from Tier 2 or 3 intervention. The Master and/or Internal Coaches also complete an Early Language and Literacy Classroom Observation (ELLCO) in the Fall and Spring to provide objective feedback and suggestions to the teaching team to improve the classroom's language and literacy environment. The Internal Coach works closely with Minnesota Reading Corps program staff and school administration to address any concerns about member performance and to conduct disciplinary action if necessary. The Minnesota Reading Corps estimates that the time commitment for Internal Coaches is 6-9 hours per member per month. The additional time commitment for required training is 56 hours for new PreK Internal Coaches and 24 hours for returning PreK Internal Coaches.[29]

Figure II.2. Minnesota Reading Corps Supervisory Structure



The Master Coach is a literacy expert employed by the Minnesota Reading Corps who serves as a literacy consultant to the Internal Coach and member(s). The Master Coach supports the Internal Coach and the member in making decisions about

[29] http://minnesotareadingcorps.org/sites/default/files/PreK%20Guide%20for%20Sites%2014-15.pdf

student eligibility for Tier 2 or 3 interventions by reviewing benchmark IGDI data. The Master Coach also helps to ensure fidelity to the Minnesota Reading Corps model. The Master Coach visits schools at different frequencies throughout the year depending on the schools' degree of experience implementing the Minnesota Reading Corps program, ranging from once a month for schools that have recently implemented the program to three times a year for schools where the program is well-established. Visits last approximately one hour per member, during which the Master Coach, Internal Coach and member(s) examine student assessment data, discuss interventions choices, review student progress, and discuss implementation challenges.

Other Master Coach responsibilities include communicating with the Internal Coach and member(s) about preparing for benchmarking; performing member fidelity checks along with the Internal Coach to ensure appropriate administration of benchmark assessments and interventions; providing consultation as needed regarding the identification and prioritization of students to receive small group or one-to-one interventions; reviewing student progress; and providing program updates to the Internal Coach and member. If the Internal Coach cannot answer a member's question, the Master Coach can often provide advice. The Master Coach can also answer questions about topics such as data entry or scheduling.

For administrative issues, such as questions about training schedules and timesheets, the Internal Coach or member can contact their Minnesota Reading Corps Program Coordinator. The Program Coordinator also helps members answer questions about their community service requirement and requested leaves of absence. Program Coordinators are also notified about all member disciplinary issues.

C. Summer Institute Training

Each summer, the Minnesota Reading Corps hosts a multi-day Summer Institute for training returning and new Master Coaches, Internal Coaches, and AmeriCorps members.[30] ServeMinnesota and Minnesota Reading Corps staff orchestrates the organizational and administrative aspects of the Summer Institute, while literacy experts conduct training sessions. This intensive, information-filled conference provides expert training in the evidence-based literacy interventions employed by the Minnesota Reading Corps. In its most basic form, the Summer Institute is a learning forum for literacy interventions and teaching techniques. However, the Summer Institute also serves an important role in developing member, coach, and school adherence to the Minnesota Reading Corps model. Speeches from former and current members, funders, parents, and officials from the Minnesota Department of Education and local school districts encourage this process and enhance the inspirational atmosphere of the training sessions. At the Summer Institute, the members also meet with their Internal Coach, and sometimes Master Coach, with whom they will be working throughout the upcoming school year.

During several intensive sessions at the Summer Institute, members learn the essential skills, knowledge, and tools needed to serve as effective literacy tutors. These sessions introduce members to the Minnesota Reading Corps PreK program model, the Literacy Rich Schedule, the SEEDS approach to high quality adult-child interaction, the interventions used in the Tier 2 and 3 small group and one-to one tutoring sessions, as well as the underlying research and theories supporting the interventions and

[30] Members attend all four days of the Summer Institute (one day orientation and three days of training). New Coaches attend three days, and returning Coaches attend one day.

program model. Importantly, members are provided with a detailed *Literacy Handbook* to serve as a constant resource for supporting program implementation. The *Handbook* provides an introduction to the Minnesota Reading Corps program, information on policies and procedures and service requirements, procedures for the benchmarking and progress monitoring of students, and specific direction and materials for implementing the Literacy Rich Schedule and conducting small group and one-to-one interventions. In addition, members are provided with online resources that mirror the contents of the *Literacy Handbook* and supplement it with other resources such as exemplar photos of a Literacy Rich Classroom, and videos of model interventions and best practices. Both the *Handbook* and website are intended to provide members with just-in-time support once they are out in their service sites, as well as with opportunities for continued professional development and skill refinement.

At the Summer Institute, PreK members receive training on the SEEDS of Emergent Literacy approach, which serves as the pedagogical framework within which members and teachers create a literacy rich classroom environment. In addition to the Summer Institute, PreK members participate in multiple smaller trainings throughout the school year. These sessions include additional training on SEEDS, instruction in administering and scoring student assessments, and implementation of large and small group interventions. The trainings are generally one-day long and are held in multiple regional locations throughout the state. Each PreK site's Internal Coach is expected to attend the sessions with their member(s).

The Summer Institute is the primary training venue not only for members, but also for Internal Coaches. At the Summer Institute, Internal Coaches receive a comprehensive orientation to the Minnesota Reading Corps PreK program, including program and early literacy background, intervention delivery, benchmarking, and progress monitoring. Internal Coaches also learn about their roles and responsibilities, including ensuring fidelity to the Minnesota Reading Corps model, orienting the member to the school, introducing school staff to the member, and coordinating school-based professional development opportunities for their members. Internal Coaches also are oriented to the layers of support provided by the Minnesota Reading Corps program, including the Master Coach and Program Coordinator.

D. The Role of Assessment Data in the Minnesota Reading Corps Program Implementation and Improvement

In the Minnesota Reading Corps PreK program, AmeriCorps members collect general outcome measure data on all PreK students in a classroom in the Fall, Winter, and Spring of each school year using the age-appropriate Individual Growth and Development Indicators (IGDIs) assessments. Internal Coaches review this data to then objectively determine eligibility for Tier 2 or 3 interventions based upon their benchmark score. Members collect monthly progress monitoring data on those students selected to receive small group or one-to-one interventions. The IGDIs assess the following five critical emergent literacy skills:

1. ***Letters Sound Fluency (LSF)*** assesses how many lowercase letter sounds a student can identify and say (e.g., l, f, m) within one minute. Students receive one point for every correct letter sound provided within one minute. The total number of correct letter sounds is the Letter Sound Fluency score. Letter sounds fluency is considered a relatively difficult alphabetic knowledge skill and is therefore only assessed among 4- and 5-year old students, not 3-year old students.

2. ***Rhyming Fluency (RF)*** tests students' phonological awareness by assessing how many rhyming words a student can correctly identify (e.g., bat and cat, car and jar, ham and jam) within two minutes. Students receive one point for every correct rhyme identified within two minutes. The total number of correct rhymes is the Rhyming Fluency score.

3. ***Letter Name Recognition (LNR)*** is measured using two different methods depending upon the age of the child. For 3-year old students, children are shown upper case letters and children are asked to name the letter. Students receive one point for every letter named correctly. The total number of letters named correctly is the Letter Name Recognition score. This test is untimed and there is a limited number of letters, thus the 3 year old letter name test is not a fluency test. In contrast, 4- and 5-year old students complete a ***Letter Name Fluency (LNF)*** test designed to assess how many upper case letter names a student can identify within one minute. Students receive one point for every letter named correctly within one minute. The total number of letters named correctly is the Letter Name Fluency score. Both LNR and LNF assess students' alphabel knowledge. Given the difference in testing methods, however, the results of the 3- and 4/5-year old letter name assessments cannot be directly compared.

4. ***Picture Name Fluency (PNF)*** tests students' vocabulary by assessing how many pictures a child can name correctly within one minute. Students receive one point for every picture named correctly within one minute. The total number of pictures named correctly is the Picture Name Fluency score.

5. ***Alliteration Fluency (AF)*** tests students' phonological awareness by assessing how many alliteration matches (e.g., hill and heart, cat and can, bike and ball) a child can correctly identify within two minutes. Students receive one point for every correct alliteration identified within two minutes. The total number of correct alliterations is the Alliteration Fluency score

Students' scores on the IGDIs are used to identify PreK students who are eligible for Tier 2 or 3 interventions. Members then collect monthly progress monitoring data on those Tier 2 and 3 students to whom they provide individualized or small-group interventions. **Table II.1** lists the specific IGDI assessments and corresponding benchmark scores used to identify eligible 4- and 5-year old PreK students for Tier 2 and 3 interventions. The benchmarks for Winter and Spring are the same for 4- and 5-year old PreK students. These benchmark scores correspond to empirically-derived target scores based on research from the Minneapolis Public Schools and the St. Croix River Education District, who both have a long history of implementing the IGDI assessments at scale and with fidelity (Bollman, 2003).[31] The benchmark scores indicate the level of literacy skill that needs to be demonstrated in order to be considered "on-track" to developing literacy skills, which in turn is an indicator of high likelihood of reaching grade level standard on a high-stakes state reading assessment in third grade. For example, in order for a 4-year old to be "on-track" to be a successful reader by third grade, they need to have a score of at least 26 on the Spring picture name

[31] Bollman, K. (2003). Analysis of IGDI performance in Minneapolis Public Schools and St. Croix River Education District, for target setting with 4- and 5-year old students. [Technical Data Analysis] Rush City, MN.

fluency assessment. Research to set benchmarks for IGDIs for 3-year old students is more limited, so we did not use benchmark scores for the 3-year old students participating in our analysis.[32]

Table II.1. Minnesota Reading Corps PreK Assessments and Winter/Spring Targets for 4- and 5-Year Old Students

Fluency Assessment	Winter/Spring Target
Letter Sounds	10
Rhyming	12
Letter Names	14
Picture Names	26
Alliteration	8

*The research to set benchmark targets for IGDIs for 3-year-old students is more limited and, therefore, we only provide benchmarks for 4- and 5-year-old students.

The Minnesota Reading Corps program uses the edSpring internet-based data entry system to record and store IGDI benchmark and progress monitoring data on all students served by the program. Monthly progress monitoring allows members to chart growth in emergent literacy outcomes among students receiving Tier 2 or 3 interventions. Progress monitoring data enables members to evaluate the effectiveness of their interventions, gauge whether students might benefit from a change in interventions, or determine whether they are ready to exit from intensive intervention. Every student's progress monitoring scores are graphed and then reviewed monthly by a collaborative team consisting of the member, Internal Coach and Master Coach. The Master Coach, Internal Coach, and AmeriCorps member discuss each student's assessment results over time before deciding to exit the student from Tier 2 or 3 tutoring.

The data intensive orientation of the Minnesota Reading Corps program provides members, coaches, teachers and principals/directors with a consistent, objective means of identifying students who would benefit from intensive intervention, tracking their progress toward achieving academic goals related to critical emergent literacy skills, and informing instruction. The assessment data play an important role in garnering site-wide support from site staff, particularly as they see quantitative improvement in student outcomes. The data also provide members and coaches with objective information about the efficacy of the interventions with individual students, which can in turn be used to tailor the most effective instruction for the student's skill level.

[32] Due to these limitations on available benchmarks, 3-year old students are sometimes identified for Tier 2 and 3 interventions using 4-year old benchmarks.

Outcome Evaluation of the Minnesota Reading Corps PreK Program

Building on the Minnesota Reading Corps program background provided in Chapter II, this chapter provides a detailed description of the methodology used to implement the Minnesota Reading Corps PreK outcome evaluation. The methodology was informed by the 2008-2009 and 2010-2011 annual Minnesota Reading Corps evaluations.[33] The chapter begins with the presentation of a logic model for the Minnesota Reading Corps program outlining key program and school inputs and activities, as well as the program's desired short-term outcomes and long-term goals. After establishing the key components of the Minnesota Reading Corps PreK program, the evaluation team presents the three primary research questions for assessing the program's effect on PreK students' emergent literacy skills (i.e., the logic model's PreK short-term outcome). These research questions guided all aspects of the evaluation design, study implementation, and data analysis.

Following our presentation of the research questions, the next section in this chapter describes the process for sampling Minnesota Reading Corps sites for the PreK evaluation. Next, the quasi-experimental design and site-level matching procedures for the study are provided, which includes key characteristics/demographics of the participating schools. The section also presents the pre-intervention (i.e., Fall benchmark) characteristics/ demographics for students in classrooms participating in the study. A baseline analysis, which confirms the integrity of the matching procedures (i.e., establishes the equality of the program and comparison students at the start of the first semester in Fall 2013), is also provided.

Finally, data collection methods and the use of administrative data are discussed, along with the analytic methods and statistical models for the quasi-experimental design study. The chapter concludes with a discussion of the limitations of the Minnesota Reading Corps PreK outcome evaluation.

A. Evaluation Logic Model

A logic model for the Minnesota Reading Corps program illustrating key program and school inputs and activities, as well as the program's desired short-term outcomes and long-term goals is provided in **Appendix A.1.**[34] The Minnesota Reading Corps logic model was developed jointly by the evaluation team and Minnesota Reading Corps program staff and served as the conceptual framework for the design of the PreK outcome evaluation. The logic model presents a comprehensive illustration of the complete Minnesota Reading Corps program, and includes inputs, activities, short-term outcomes and long-term goals for four primary program constituencies: PreK students, K-3 students, AmeriCorps members, and schools.

The focus of the PreK outcome evaluation was to assess the effect of Minnesota Reading Corps program participation on preschool students' emergent literacy skills. As such, the evaluation focused on only those components of the logic model relevant to PreK students. These components include Minnesota Reading Corps program and school-based inputs and

[33]Bollman, K. & Silberglitt, B. (2009). *Minnesota Reading Corps Final Evaluation 2008-2009*. Minneapolis, MN: Minnesota Reading Corps.; Bollman, K. & Silberglitt, B. (2011). *Minnesota Reading Corps Final Evaluation 2010-2011*. Minneapolis, MN: Minnesota Reading Corps.

[34] A comprehensive description of the Minnesota Reading Corps logic model is available in the following two reports: *Feasibility Study of the Minnesota Reading Corps* (2013) and *Process Assessment of the Minnesota Reading Corps* (2013)

resources, Internal Coach and AmeriCorps member coaching and supervision, AmeriCorps member individualized literacy interventions for students, and student proficiency outcomes.

Four key Minnesota Reading Corps program and school-based inputs and resources are essential to successful PreK program implementation: 1) Minnesota Reading Corps program selection of schools based on degree of student need and school capacity to partner effectively with the program; 2) school identification of Tier 2 and 3 PreK students within the classroom based on benchmark assessment of students' emergent literacy skills; 3) web-based data management systems to track and monitor student progress with literacy interventions (i.e., edSpring); and 4) school use of research-based core literacy curriculum.

In addition to the Minnesota Reading Corps program and school-based inputs, three important Minnesota Reading Corps program inputs related to AmeriCorps members included: 1) joint Minnesota Reading Corps and school recruitment, screening and placement of members in schools; 2) comprehensive Minnesota Reading Corps training of members and Internal Coaches in literacy interventions, assessment, data-driven decision-making and program rules; and 3) school identification and assignment of dedicated Internal Coaches to support and monitor the members. The logic model also illustrates the multiple layers of supervision and coaching the Minnesota Reading Corps program provides to its school-based Internal Coaches and AmeriCorps members.

As shown in the logic model, the Minnesota Reading Corps PreK program's primary activities include: 1) supporting classroom instruction and enriching the literacy environment within the classroom; 2) conducting benchmark testing three times per year (Fall, Winter and Spring) to identify students in need of small group or one-to-one intervention (i.e., Tier 2 and 3 students); 3) delivering interventions to eligible students; 4) assessing and charting monthly student progress on age-specific emergent literacy skills using the IGDI assessment and edSpring (i.e., progress monitoring); 5) "exiting" students from Tier 2 or 3 interventions once they achieve assessment score targets; and 6) identifying any new students eligible for small group interventions. The intended short-term outcomes of these activities are demonstrated improvement on IGDI measures at the subsequent benchmarking period (i.e., Winter, Spring). The desired long-term outcome of the Minnesota Reading Corps PreK program is for preschool students to achieve Kindergarten-ready targets by the end of the school year.

Thus, when reviewing the logic model, note that the PreK outcome evaluation assessed the cumulative effect of three specific program elements on PreK students' emergent literacy outcomes: 1) the Minnesota Reading Corps central operations and school-based inputs and resources; 2) Internal Coach and AmeriCorps member coaching and supervision; and 3) AmeriCorps member whole class enrichment and Tier 2 and 3 interventions.

B. PreK Outcome Evaluation Research Questions

As the logic model presented above illustrates, the Minnesota Reading Corps program's short-term objective is to improve students' literacy skills so they are Kindergarten-ready. The primary goal of the Minnesota Reading Corps PreK outcome evaluation was to independently assess the effect of the program on PreK students' emergent literacy scores. To achieve this goal, the PreK outcome evaluation focused on the following three research questions:

RQ1: What is the effect of the Minnesota Reading Corps program on student literacy outcomes?

RQ2: Does the effect on literacy outcomes vary by student characteristics/demographics?

RQ3: Do effects on literacy outcomes vary by site/school?[35]

To explore these research questions, the evaluation team analyzed age-appropriate literacy assessment scores from a sample of 1,534 PreK students enrolled at 50 diverse public elementary schools, private community-based institutions, and Head Start programs during the 2013-2014 school year. Half of the sites (25) were experienced implementers[36] of the Minnesota Reading Corps program (i.e., program sites). The remaining 25 sites (i.e., comparison sites) were selected for participation in the study based on a prescribed set of educationally significant baseline characteristics which matched those of the sampled Minnesota Reading Corps program sites (e.g., urbanicity, program type, student age mix, etc.). Thus, 25 *pairs* of sites (i.e., 25 program sites and 25 comparison sites) participated in the evaluation. Students who attended Minnesota Reading Corps program sites were enrolled in PreK classrooms where one or more AmeriCorps members served. Data from the Fall, Winter, and Spring benchmarks were used to answer the evaluation's primary research questions, which estimate the effect of the Minnesota Reading Corps program on students' emergent literacy outcomes.

C. Site Selection

The site selection process was designed to ensure representation of the diverse schools participating in the Minnesota Reading Corps PreK program. Therefore, site selection was both purposive and involved a multi-step stratified sampling process. Since the Minnesota Reading Corps program began 10 years ago in 2003 and expanded rapidly over the years, there was a wide range in the number of years sites had participated in the program. As it was not our intention to assess how well sites adopted/executed the program during their *first* year of participation, the site sampling process began by limiting the sampling frame to only sites that had fully implemented the Minnesota Reading Corps PreK program for at least one year. Next, to ensure geographical diversity, sites were stratified by urbanicity (i.e., urban, suburban, and rural), institution type (public school, community-based program and Head Start),[37] and student ages served within a classroom (4- and 5-year old students only or a mix of 3-, 4-, and 5-year old students).[38] Thus, the sampling frame consisted of 175 sites, with 12 stratum for sampling within urbanicity, institution type, and age group.[39] A total of 40 sites were selected, using Probability Proportional to Size (PPS),

[35] We were also interested in examining the effects of AmeriCorps member type (i.e., Educator Corps or Community Corps) on student emergent literacy outcomes. However, given the small sample size among Minnesota Reading Corps PreK sites (N=25) participating in this study, as well as the fact that we did not specifically sample for member type, we could not examine this question. We did conduct a balance test among the 25 program schools to determine if it might be possible to conduct an exploratory analysis. Unfortunately we found significant lack of balance in the types of members at sites, preventing us from conducting such an analysis.

[36] That is, the program had been in operation at the site for at least one full school year.

[37] Although there were originally five types of institutions, including private and charter schools, only public schools, community-based, and Head Start programs were included in the sample. Only four schools were charter and private schools and could not be easily combined with other categories due to the fact that they are not similar to any of the other school types. Therefore, these four schools were deleted from the sampling frame.

[38] Only three schools served 3-year old students only, so they were excluded from the sampling frame.

[39] When a crosstab of schools was run by institution type and urbanicity, there were very few schools in some categories. As a result, suburban community-based, suburban head start, and rural community-based schools were deleted from the sampling frame; they only comprised seven schools in total.

whereby larger sites based on student enrollment (defined as the number of PreK students served by the Minnesota Reading Corps during the 2012-2013 school year) had a higher probability of selection. Using PPS ensured a statistically adequate sample size to conduct the PreK outcome evaluation. It is important to note that while the Minnesota Reading Corps program staff encouraged sites to participate, participation in the evaluation was voluntary. In the end, 39 sites agreed to participate in the PreK outcome evaluation during the 2013-2014 school year.[40]

To identify a comparison group for the PreK QED, the study followed U.S. Department of Education's Institute of Education Sciences' (IES) What Works Clearing House (WWC) guidelines for a QED that "*Meets Evidence Standards with Reservations.*" PreK programs were eligible for consideration for the comparison group if: 1) the program had no history of implementing the Minnesota Reading Corps program; and 2) the program staff had not been trained in the SEEDS of Emergent Literacy approach.[41] From this group of eligible PreK sites, a comparison group was identified by matching the site to a Minnesota Reading Corps PreK program site on a select group of educationally important pre-intervention characteristics[42] (i.e., urbanicity, institution type, classroom composition of student ages, percentage of students eligible for FRPL,[43] and percentage of students who were DLLs). Additional secondary variables were also considered when matching program and comparisons sites (e.g., site enrollment, instructional time, and student to teacher ratio), though they were primarily used to sharpen the match when multiple potential match sites were identified. The final set of variables is provided in Exhibit III.1.

Table III.1. PreK QED Matching Variables

Order	Variable	Description
Primary Matching Variables		
1	Urbanicity	Urban, suburban or rural
2	Institution Type	Public school, Head Start program, Community-based program
3	Classroom Composition of Student Ages Served	Only 4/5-year old students or mixed 3-,4- and 5-year old students
4	Socio-Economic Status	% students eligible for Free or Reduce Price Lunch (FRPL) and/or % poverty of families with children in the census tract within which the site is located
5	Dual Language Learners (DLL) Status	% of students who do not speak English as a first language.
Secondary Matching Variables		
6	Site Enrollment	Number of students enrolled in the PreK program at the site.
7	Instructional Time	Number of hours of instruction per week (e.g., half vs. full day; number of days per week)
8	Student to Teacher/Adult Ratio	The number of students for every teacher or adult in the classroom.

[40] The school that did not participate referenced staff shortages as the reason.

[41] Since SEEDS is an integral part of the Minnesota Reading Corps program, including SEEDS trained sites in the evaluation would have eliminated the possibility of detecting an effect of this critical program element.

[42] These variables were based on WWC recommendations, administrative data collected by Minnesota schools at the time, the literature on predictors of preschool emergent-literacy outcomes, and consultation with the project's Technical Working Group (TWG).

[43] A measure of household poverty and socio-economic status

Once potential comparison sites were identified, the evaluation team approached site administrators to gain their participation in the study through a prescribed recruitment process. Several sites agreed to participate because they would benefit from obtaining access to the assessment data we collected on their students after the study period was complete. In the end, the study team was able to match 29 schools to Minnesota Reading Corps programs and recruit 25 sites to participate in the study. Thus, 25 pairs (25 program sites and 25 comparison sites) for a total of 50 sites participated in the outcome evaluation. The total student sample size was determined by the number of students enrolled in a participating PreK classroom at one of the 50 selected sites. If a comparison site had more classrooms and students than was required to achieve sufficient statistical power (i.e., 30 students across two classrooms), the comparison site classrooms that best mirrored the matched-Minnesota Reading Corps program classroom on amount of instructional time (i.e., days per week, hours per day) were selected. The list of participating schools and their key characteristics are provided in **Table III.2** below.

Table III.2. Characteristics of schools participating in the Minnesota Reading Corps PreK Outcome Evaluation (Fall 2013)

School	MRC	Location in Minnesota	Urbanicity[1]	Program Type	Classroom Type	% DLL	% FRPL	School Enrollment 2012-13	Study Participants 2013-14 (N)
Child Care Resource and Referral Head Start: Brookside		Southeast	Rural	Head Start	Mix of 3-, 4-, and 5-year old students	46	100	75	65
Austin Head Start		Southeast	Rural	Head Start	Mix of 3-, 4-, and 5-year old students	55.5	100	68	24
Kootasca Head Start: Itasca Resource Center		Northcentral	Rural	Head Start	4- and 5-year old students only	0	100	34	31
Backus Head Start		Northcentral	Rural	Head Start	3- year old students; 4- and 5-year old students only	0	100	42	26
Duluth Head Start: Stowe Elementary		Northeast	Rural	Head Start	Mix of 3-, 4-, and 5-year old students	0	100	32	30
Bemidji Head Start		Northcentral	Rural	Head Start	Mix of 3-, 4-, and 5-year old students	0	100	98	28
Kootasca Head Start: Deer River (King Elementary)		Northcentral	Rural	Head Start	4- and 5-year old students only	0	100	34	17
Blackduck Head Start		Northcentral	Rural	Head Start	4- and 5-year old students only	13	100	30	12
Minneapolis Public Schools: Waite Park Community		Metro	Urban	Public	4- and 5-year old students only	18	70	40	34
Brimhall & Emmett Elementaries		Metro	Urban	Public	4- and 5-year old students only	32	75	30	29
Becker Early Childhood		Central	Rural	Public	Mix of 3-, 4-, and 5-year old students	1	19	84	80
Cannon Falls Preschool		Southeast	Rural	Public	Mix of 3-, 4-, and 5-year old students	6.7	18	95	18
Albany Area Schools: Early Childhood Center (Avon)		Central	Rural	Public	4- and 5-year old students only	0	30	49	52
Cold Spring Elementary		Central	Rural	Public	4- and 5-year old students only	17	31	84	23
Saint Paul Public Schools: Heights Community School		Metro	Rural	Public	4- and 5-year old students only	55	-	40	39

School	MRC	Location in Minnesota	Urbanicity[1]	Program Type	Classroom Type	% DLL	% FRPL	School Enrollment 2012-13	Study Participants 2013-14 (N)
Community of Peace		Metro	Urban	Public	4- and 5-year old students only	26	31	42	26
Elk River Public Schools: Rogers Elementary		Metro	Suburban	Public	4- and 5-year old students only	6	23	53	31
Delano Wee Tiger		Metro	Suburban	Public	4- and 5-year old students only	0	14	114	28
Probsfield Early Learning		Northwest	Rural	Public	4- and 5-year old students only	1	11	75	33
Dilworth Elementary		Northwest	Rural	Public	4- and 5-year old students only	0	30	40	36
Community Action Partnerships of Ramsey & Washington Counties: Mt. Airy		Metro	Urban	Head Start	Mix of 3-, 4-, and 5-year old students	78	40	-	74
Families Together		Metro	Urban	Head Start	Mix of 3-, 4-, and 5-year old students	0	100	44	26
Duluth Head Start: Laura MacArthur		Northeast	Rural	Head Start	Mix of 3-, 4-, and 5-year old students	0	100	64	63
Hermantown Head Start		Northeast	Rural	Head Start	Mix of 3-, 4-, and 5-year old students	5.3	8	33	36
YWCA of Minneapolis: Downtown		Metro	Urban	Community	Mix of 3-, 4-, and 5-year old students	3	45	32	43
Joy Academy		Metro	Urban	Community	Mix of 3-, 4-, and 5-year old students	-	51	20	9
New London Spicer: Cub Kids		Southwest	Rural	Public	Mix of 3-, 4-, and 5-year old students	0	26.4	20	44
Humphrey Elementary		Metro	Rural	Public	Mix of 3-, 4-, and 5-year old students	1	28	68	37
Burnsville Public School District: Diamondhead Education Center		Metro	Suburban	Public	Mix of 3-, 4-, and 5-year old students	56	38.2	121	164
Longfellow Elementary		Southeast	Suburban	Public	Mix of 3-, 4-, and 5-year old students	23	48	-	29
North Branch Early Childhood: North Branch Early Childhood		Central	Rural	Public	Mix of 3-, 4-, and 5-year old students	5	27	167	141

School	MRC	Location in Minnesota	Urbanicity[1]	Program Type	Classroom Type	% DLL	% FRPL	School Enrollment 2012-13	Study Participants 2013-14 (N)
Fergus Falls Public Schools: Otter Preschool		Northwest	Rural	Public	Mix of 3-, 4-, and 5-year old students	3	43	200	30
Oakdale Elementary		Metro	Suburban	Public	4- and 5-year old students only	32	32	32	34
Melrose Elementary		Central	Suburban	Public	4- and 5-year old students only	33.3	50	29	34
Kerkhoven-Murdock Sunburg School District: Murdock		Southwest	Rural	Public	4- and 5-year old students only	2	27	31	42
Paynesville Elementary		Southwest	Rural	Public	4- and 5-year old students only	0	38	36	26
Pine City Elementary		Northeast	Rural	Public	4- and 5-year old students only	0	43	27	29
Pillager Elementary		Central	Rural	Public	4- and 5-year old students only	0	54	29	28
TCU (TriCity United) School Readiness: Lonsdale School Readiness		Metro	Rural	Public	Mix of 3-, 4-, and 5-year old students	0	43	49	47
Rainbow Preschool		Metro	Rural	Public	Mix of 3-, 4-, and 5-year old students	1	25	55	34
YMCA of Greater St. Paul: Midway		Metro	Urban	Community	4- and 5-year old students only	10	85	20	19
St. Paul Eastside YMCA		Metro	Urban	Community	3- year old students; 4- year old students; Mix of 3-,4-year old students	.05%	-	78	17
Fair Oaks Elementary		Metro	Suburban	Public	4- and 5-year old students only	50	83	36	18
Talahi Elementary		Central	Suburban	Public	4- and 5-year old students only	39.4	91.7	-	28
Duluth Head Start: Meyers Wilkens Elementary		Northeast	Rural	Head Start	Mix of 3-, 4-, and 5-year old students	0	100	62	65
Walker Head Start		Northcentral	Rural	Head Start	Mix of 3-, 4-, and 5-year old students	0	100	30	24
Elk River Public Schools: Zimmerman Elementary		Metro	Suburban	Public	4- and 5-year old students only	8	23	68	31

School	MRC	Location in Minnesota	Urbanicity[1]	Program Type	Classroom Type	% DLL	% FRPL	School Enrollment 2012-13	Study Participants 2013-14 (N)
Winsted Elementary		Metro	Suburban	Public	4- and 5-year old students only	4.4	42	-	30
Saint Paul Public Schools: Dayton's Bluff Elementary		Metro	Urban	Public	4- and 5-year old students only	48	91	40	35
Zanewood Elementary		Metro	Urban	Public	4- and 5-year old students only	41.3	83	40	23

Table III.3 presents descriptive statistics by age for the PreK students included in the evaluation**.** Demographics include gender, race/ethnicity, Dual Language Learner (DLL) status, and Fall benchmark scores. During the school year, some students left the school area (i.e., moved) or were chronically absent and did not complete all three benchmark assessments. These students were removed from the analytic sample. Thus, the final sample of students included in the evaluation totaled 1,534 students.[44]

The evaluation team conducted a power analysis prior to developing the evaluation's sampling plan, in which the number of students required to detect a difference between program and comparison groups of students was calculated. The power analysis relied on the student, member, and site population numbers reported by the Minnesota Reading Corps program from the 2012-2013 school year. For this analysis, we estimated the minimum detectable effect (MDE) for a given number of schools, assuming 30 students per program and comparison school would participate in the evaluation. The power analysis employed previous Minnesota Reading Corps program data on PreK student-level outcomes to estimate the necessary design parameters (specifically, the effects of clustering students in schools). Our analysis revealed that, assuming power of 0.80 and an alpha level of 0.05, 25 schools in each condition (program and comparison) would produce an MDE of about 0.2 standard deviations. Thus, assuming 25 schools with 30 students in each school would result in a required sample size of 750 students to detect a substantively significant difference between program and comparison groups. As with most cluster level effects, the power results are relatively robust to minimal loss of students between data collection periods; however, the MDE increases as the number of schools decrease (that is, we lose sensitivity as we lose schools participating in the study).

[44] For each grade, we demonstrate low levels of attrition assuming the "liberal" standard outlined in the *WWC Evidence Review Protocol for Early Childhood interventions (Version 2):* http://ies.ed.gov/ncee/wwc/pdf/reference_resources/ece_protocol_v2.0.pdf

Table III.3. Program and comparison student participants for the Minnesota Reading Corps PreK Outcome Evaluation (Fall 2013)

	3-year old students (N= 286)	4- and 5-year old students (N= 1,480)
	Percent	**Percent**
Female	48%	47%
Race/Ethnicity		
White	52%	66%
Black	15%	11%
Asian	10%	7%
Hispanic	10%	8%
Other	14%	9%
Dual Language Learner (DLL)	18%	14%

Table III.3 shows that demographics somewhat varied by age group. Among 3-year old students, a little more than half were White (52%), 15% Black, and 14% "Other." Only 10% of 3-year old students were Asian and 10% Hispanic. Among 4- and 5-year old students, an even higher percentage of students were White (66%) with smaller percentages of children of other races represented (11% Black, 7% Asian, 8% Hispanic, and 9% "Other"). These statistics are not unexpected given that the state of Minnesota has higher percentages of White students than the broader American population.[45] Also, a relatively small percentage of the analytic sample included students who were classified by their sites as Dual Language Learners (DLLs), which was not unexpected given the low percentage of minority children in the sample.

Table III.4 compares key demographic variables between students enrolled in the Minnesota Reading Corps program and comparison sites, including average Fall benchmark (baseline) scores. The 4- and 5-year old students at program and comparison sites showed no significant differences on key demographic variables, thus confirming that sites were adequately matched on most variables. For 3-year old students, some differences were found, specifically regarding smaller racial groups and DLL status. However, these differences may result from the substantially smaller sample sizes for 3-year old students. While few major differences were found by student demographics, some comparison sites reported higher average Fall benchmark scores than their matched Minnesota Reading Corps sites on some outcome measures. As a result, our statistical approach controlled for the Fall benchmark scores to account for this imbalance. Importantly, the comparison group students posted slightly higher Fall benchmark scores on average than students in the program group, so these differences at baseline would benefit the comparison sites rather than Minnesota Reading Corps program sites.

[45] http://quickfacts.census.gov/qfd/states/27000.html

Table III.4. Differences between Comparison and Program group students by age (Fall 2013)

	3-year old students			4-year old students			5-year old students		
	C-P	SE(C-P)	Sig.	C-P	SE(C-P)	Sig.	C-P	SE(C-P)	Sig.
Female	0.04	0.05		-0.02	0.03		0.07	0.07	
Race/Ethnicity									
White	-0.08	0.05		0.03	0.03		0.00	0.06	
Black	0.10	0.04	**	0.02	0.02		0.00	0.04	
Asian	0.06	0.03	*	0.01	0.01		0.02	0.02	
Hispanic	-0.01	0.03		0.01	0.01		0.06	0.03	
Other	-0.10	0.03	**	-0.01	0.01		0.02	0.02	
Dual Language Learner (DLL)	0.13	0.04	**	-0.02	0.02		-0.01	0.05	
Fall Scores									
Letter Sounds				0.32	0.30		1.09	1.19	
Rhyming	1.19	0.36	**	0.76	0.31	*	3.87	1.00	**
Letter Names	2.80	0.87	**	2.47	0.59	**	2.42	2.12	
Picture Names	0.44	0.95		0.90	0.47		1.80	1.23	
Alliteration	0.24	0.30		0.70	0.22	**	2.33	0.77	**

Key: C=Comparison, P=Program (Minnesota Reading Corps), SE=Standard Error

*p<.05; **p<.01

D. Data Collection

As previously discussed, IGDI assessment scores are the primary sources of data for PreK student emergent literacy outcomes at Minnesota Reading Corps sites. The evaluation team obtained all benchmark assessment data from the Minnesota Reading Corps program for all 25 Minnesota Reading Corps PreK sites selected for participation in the evaluation. As mentioned previously, AmeriCorps members collect benchmark data three times a year on all students in their Minnesota Reading Corps PreK classrooms to determine eligibility for Tier 2 or 3 small group or one-to-one intervention. Given that Members already collect this data, and so as not to duplicate assessment efforts, the evaluation team requested access to the 2013-2014 Fall, Winter, and Spring benchmark data for our analysis of student outcomes.

The evaluation team obtained benchmark assessment data directly from the Minnesota Reading Corps program. At the end of the 2013-2014 school year, the complete dataset was de-identified and exported to the evaluation team for analysis. The Minnesota Reading Corps provided the evaluation team with other administrative data including student and AmeriCorps member demographics. All assessment and demographic data was combined into a single dataset that is the source of all analyses and results presented in this report.

The evaluation team was responsible for collecting equivalent IGDI data three times a year (Fall, Winter, Spring) from PreK students at the comparison sites. In order to collect this data, the evaluation team sent field testers, who would be responsible for assessing students at comparison sites, to the same Minnesota Reading Corps IGDI data collection training as that attended by AmeriCorps members. This process ensured that the field testers: 1) used the same IGDI data collection instruments for

collecting student level benchmarks on comparison site students as those used to collect data from students at the Minnesota Reading Corps program sites; and 2) received the same standardized training in assessment administration and scoring as the AmeriCorps members. This common use of instrumentation and training ensured commonality of assessment practices across both program and comparison sites.

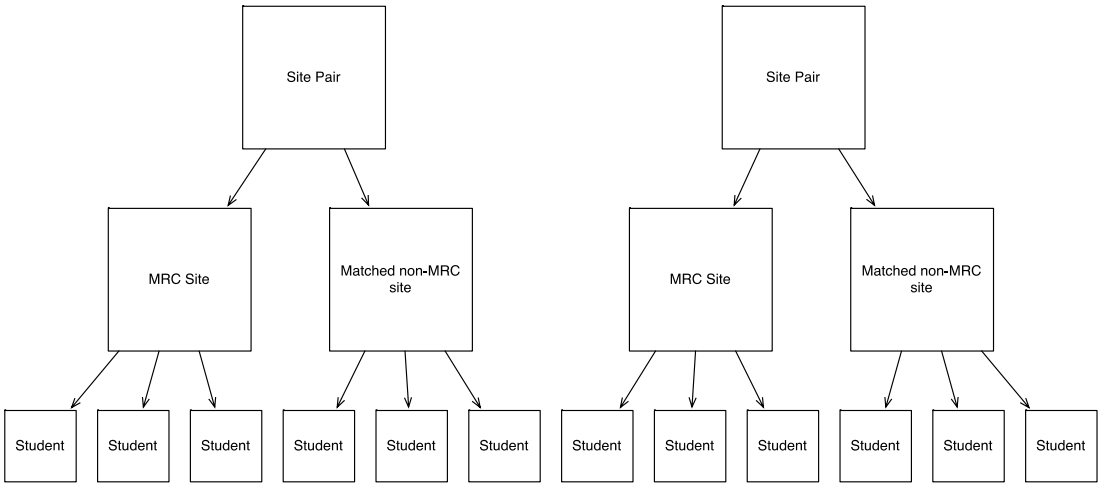
In addition to the use of common measures and receipt of common training, whenever possible the same field testers and research staff were assigned to collect data from the same students at the same sites throughout the school year. This allowed the field testers and research staff to build strong and trusting working relationships with the administrators, teachers and students at participating comparison sites. The students at comparison sites became familiar and comfortable with the field testers over the course of the year, which further facilitated testing and data collection.

Upon completion of data collection, the student-level IGDI data collected from comparison sites were combined for analysis with de-identified IGDI data from the Minnesota Reading Corps dataset described earlier. The resulting dataset contained all the assessment and demographic data collected from comparison sites and existing data extracted for participating Minnesota Reading Corps program sites. The final dataset was processed, cleaned, and coded in preparation for data analysis.

E. Analysis

In this section, we provide a summary of the methods and analytic approaches used to analyze the student assessment data collected in Fall, Winter, and Spring. As discussed above, each Minnesota Reading Corps program site was paired with a comparison site on several key variables. During data analysis, these variables were equated using statistical controls so as to adjust for pre-intervention differences among groups. This produced a "site pair," comprised of one Minnesota Reading Corps program site and one matched comparison site. The hierarchy of the data is illustrated in Figure III.5, where each site pair contains two sites, and each site contains a set of students. The analysis was conducted separately for 3-year old students and then for 4- and 5-year old students, because 1) 3-year old students are developmentally distinct from 4- and 5-year old students, 2) there is more variability in prior exposure to PreK among 4- and 5- year old students than among 3-year old students, and 3) the letter name assessments differed for 3-year old students versus 4- and 5-year old students. A more detailed methodology section is provided in **Appendix A.3**. As explained in our presentation of the research questions in section III.B above, the analysis was structured to answer three primary research questions, which each address the effect of the program on PreK students' emergent literacy outcomes. Other analyses included robustness checks on the variability of the treatment effects and an intraclass correlation analysis of Fall to Spring gains.

Figure III.5. Illustration of PreK Evaluation Data Hierarchy



Outcome Analysis

The overall goal of the study was to obtain a measure of the average treatment effect of the Minnesota Reading Corps program within each site pair by each student age group. We examined differences by employing an ANCOVA (Analysis of Covariance) regression using fixed effects for site pairs. The ANCOVA regression predicts the Winter or Spring benchmark score (outcome) as a function of the student level covariates, namely the Fall benchmark score and age (3-year old and 4/5-year old), in addition to the site level Minnesota Reading Corps program participation variable (indicator). The Minnesota Reading Corps indicator coefficient is then the average difference in the difference between the dependent score (Winter or Spring) and the Fall score for an average student. By centering the Fall score on the grand mean, the intercept of the model is the growth for students at comparison sites, and the coefficient for the Minnesota Reading Corps indicator is the difference in the growth for program students relative to comparison students.

Two types of subgroup analyses were employed by the evaluation team. First, we added specific covariates and moderators to the ANCOVA model and jointly tested the effects to determine if there were significant differences in effects across major subgroups, implying that the Minnesota Reading Corps program may be more or less beneficial for selected subgroups of students. For the second analysis (for 4- and 5-year old students only), we used the moderators of the major subgroup indicators (e.g., females, males, etc.) to estimate the net average treatment effect of the Minnesota Reading Corps program for 4- and 5-year old students, essentially subdividing the data by major subgroup and applying the same analysis as for the entire sample. Due to sample size constraints we were unable to conduct subgroup analysis on the 3-year old student sample. Subgroups were defined based on characteristics provided at baseline and each level was determined by individual characteristics, including gender, race/ethnicity, and Dual Language Learner (DLL) status.

Robustness Analysis

The evaluation team also tested the variability of the program effect at the assigned site pair level. For this analysis, we estimated the Minnesota Reading Corps effect between program and comparison sites, and then estimated whether, on average, this difference was positive. The findings from the robustness analysis are provided in **Appendix C**.

Site-Level Effects on Assessment Scores

The Minnesota Reading Corps PreK program operates in a diverse range of educational contexts (i.e., public schools, Head Start centers, and community-based preschools). An important research question for the Minnesota Reading Corps program is whether there are differences in student-level effects of the program depending by site type. Therefore, we conducted subgroup analysis on one site-level variable-- whether students attended a public school or a Head Start program. We did not have enough community-based sites in the sample to conduct subgroup analyses on students attending this type of site. Given the diversity of early childhood education programs (e.g., curricula, attendance time, student/family demographics, funding source, etc.), it was unclear if and how the Minnesota Reading Corps PreK program might interact with the type of site (i.e., public school or Head Start center). The results of this analysis allowed us to examine whether the Minnesota Reading Corps PreK program is more or less effective in public preschools or Head Start centers.

One additional analysis was performed to examine whether student outcomes varied by site-- an intraclass correlation (ICC) analysis was conducted to determine whether pair-level random effects influenced program impacts for students attending a Minnesota Reading Corps PreK program site. In other words, we examined whether there was variation in the effect of the program on students across the 25 pairs of sites (program vs. comparison). The site pair-level ICC measures the degree to which students, who attended one site within the same pair, correlate with students in other site pairs. We examined pair-level effects rather than site-level effects because Minnesota Reading Corps program and comparison sites were matched on key site characteristics prior to baseline.

F. Limitations of the Study

The primary objective of the Minnesota Reading Corps PreK evaluation was to assess the effect of the Minnesota Reading Corps program on preschool students' emergent literacy outcomes. In order to achieve this objective, the evaluation was designed to measure Minnesota Reading Corps program effects in a rigorous quasi-experimental design study. However, unavoidable limitations inherent in the study design and in working with schools and students constrained some aspects of the evaluation's design, implementation, and analysis.

The single most important limitation of the study design is its inability to control for unobserved differences between the Minnesota Reading Corps program and comparison sites. Despite implementing a thoughtful approach to the matching process using educationally significant baseline measures, it is not possible to obtain or match on all possible site-level factors which may bias student outcomes. For example, the strongest predictor of student performance on outcome measures is their performance at baseline (i.e., Fall benchmark [pretest] score). Our matching process was conducted without access to any baseline data because it had yet to be collected, thereby, possibly resulting in bias within our site-level pairs. To examine these differences and test the integrity of our matching process, we conducted statistical tests of average Fall scores within pairs (simple t-tests) and found the vast majority of our site-level pairs did not result in significant differences at baseline across the five outcome measures. For further information on our balance tests (school matching validity analysis), please see **Appendix A.2**.

Another major constraint is that site participation in the evaluation was voluntary. As such, it is plausible that our estimates may not generalize to the population. We first addressed this issue by using stratified random sampling to select Minnesota Reading

Corps PreK sites; however, we were unable to find reasonable matches for all of our sampled schools resulting in a possibly biased sample. We conducted sensitivity analyses to better identify differences between the Minnesota Reading Corps sites that participated in the study and those that did not, mainly due to our inability to identify a matched comparison school. The findings from these analyses, available in **Appendix A.2**, confirm the representativeness of our sample.

Unequal sample sizes across the two age groups (3-year old vs. 4- and 5-year old) were another program-induced constraint that resulted in differences in statistical power to detect program effects within age groups. The different sample sizes by age were unavoidable as very few sites in our original sampling frame had 3-year old only classrooms. This forced us to stratify the sample by the two larger groups of 4- and 5-year old classrooms and mixed 3-, 4-, and 5-year old classrooms; thus, less 3-year old students participated in the study.

Another limitation inherent in the execution of the evaluation was the necessity to assess students three times during the school year at both the program and comparison sites. It is unclear what effect if any the act of being assessed might have had on student outcome scores. It is possible that simply participating in these assessments might positively affect student proficiency. If such a test effect exists it is likely to be small. Further, the effect should benefit the comparison group, increasing their scores above what one would typically expect had they not been assessed.

More common limitations in education studies that the evaluation team anticipated included: student attrition, data integrity, and tracking alternate interventions. As mentioned above, the evaluation team implemented a quasi-experimental design using matched comparison sites. Benchmark assessment scores were then taken three times during the school year on all students within participating classrooms and sites. Statistical tests showed that students in the program and comparison groups did not differ on important demographic variables and proficiency measures at the beginning of the school year. As is inevitable, students moved away or were chronically absent (i.e., attrition). When this occurred, the affected student was dropped from the study's analytic sample. The deletion of cases was moderate, reducing the sample size from 1,766 to 1,534 students (a loss of about 24 percent) and could result in an imbalance between the program and comparison groups. However, a more central concern is the differential attrition between program and comparison groups. The comparison sites had attrition of about 18 percent of students whereas the Minnesota Reading Corps program sites had about 27 percent attrition. For a more thorough analysis of the differences between program and comparison groups, please see our analysis developed for the What Works Clearinghouse (WWC) located in **Appendix D**.

Another common limitation related to interpretation of outcome evaluation results is concerns as to whether alternative interventions similar to the treatment (in this case, the Minnesota Reading Corps' Literacy Rich Schedule and SEEDS approach to instruction) could similarly affect student outcomes at comparison programs. To overcome this limitation, the evaluation team excluded sites where staff had been trained in the SEEDS of Emergent Literacy, which is an integral part of the Minnesota Reading Corps PreK program. No other similar alternative interventions were identified at the PreK comparison sites.

Study Findings

This section of the report presents the findings from the analysis of IGDI assessment data collected in Fall and Spring from PreK students enrolled at the program or comparison sites during the 2013-2014 school year. The findings from the analysis of Fall and Winter benchmark scores are provided in **Appendix B.1**. As discussed earlier, the program group consisted of preschool children who attended a classroom where the Minnesota Reading Corps PreK program was being implemented during the 2013-2014 school year, while the comparison group consisted of preschool students who attended sites that had not participated previously or currently in the program.

To address the first research question (RQ1) of whether the Minnesota Reading Corps program had an effect on PreK students' literacy outcomes, the evaluation team compared the Spring assessment scores of students who attended a program site to the scores of those who attended a similar comparison preschool site that was not implementing the Minnesota Reading Corps. As discussed in Chapter III, the evaluation team estimated the average treatment effect by developing a single ANCOVA model for each outcome measure and age group (3-year old students and 4- and 5-year old students). In addition to providing estimated differences between program and comparison groups, we also present standard errors, confidence intervals and statistical tests.

Below the evaluation team provides the findings from the Spring benchmark scores across the five IGDI outcome measures by age group. (Findings for Winter benchmark scores are provided in **Appendix B.1.**) Following the presentation of findings for all students, we provide the results of our subgroup analysis for gender, race/ethnicity, and DLL status (RQ2). We conclude this chapter with the presentation of results from our examination of student effects by AmeriCorps member type and site (RQ3). More detailed tables on the models used are provided in **Appendix B.2**.

Overall Findings for 4- and 5-year Old Students

The Minnesota Reading Corps PreK program had statistically significant and large effects across all five IGDI outcome measures of emergent literacy skills for 4- and 5-year old students. Below we provide a discussion of the findings in growth between Fall and Spring benchmarks for 4- and 5-year old students. To better illustrate the findings on each outcome measure, we also provide several figures showing the average scores on the Fall, Winter, and Spring benchmarks for PreK students in Minnesota Reading Corps program and comparison site classrooms. Average growth for the school year, which is provided in **Table IV.1**, is calculated by taking the difference between the Spring and Fall scores for program and comparison site students, while controlling for the Fall (baseline) score. We refer to the findings in both Table IV.1 and the various figures in reporting the study findings.

Table IV.1. Average growth among 4- and 5-year old PreK students by Spring

IGDI Fluency Assessment	Treatment Assignment	N	Average Growth	SE	Effect Size	Confidence Interval	
Letter Sounds	Program+	783	8.22***	0.33			
	Comparison	484	4.42***	0.58			
	Difference	1267	3.80***	0.90	0.71	0.36	1.05

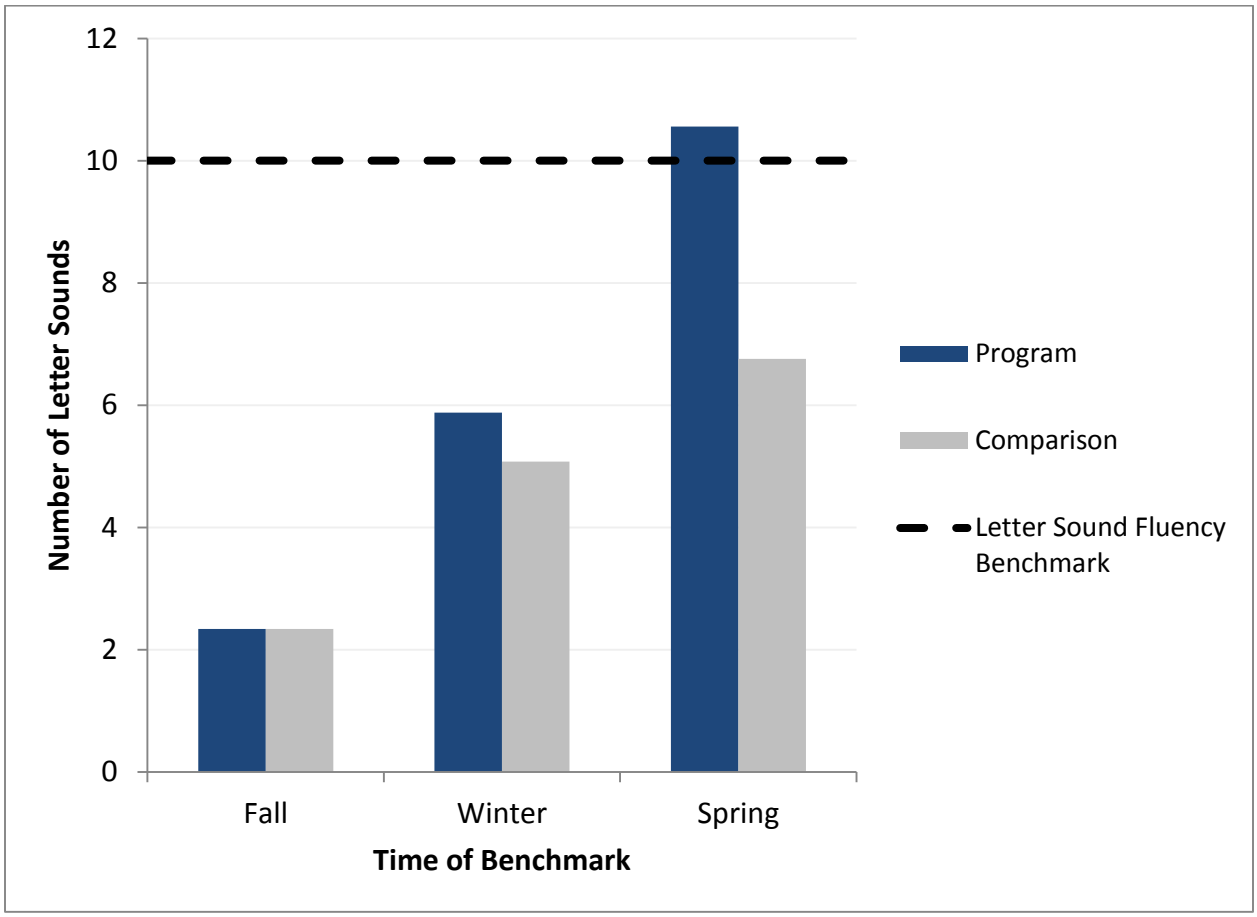
Rhyming	Program	789	7.28***	0.23			
	Comparison	553	3.77***	0.31			
	Difference	1342	3.51***	0.52	0.66	0.46	0.87
Letter Names	Program	802	14.01**	0.45			
	Comparison	552	9.87***	0.72			
	Difference	1354	4.15**	1.17	0.40	0.17	0.63
Picture Names	Program	793	8.68***	0.28			
	Comparison	550	4.65***	0.39			
	Difference	1343	4.03***	0.66	0.49	0.32	0.65
Alliteration	Program	792	5.37***	0.17			
	Comparison	486	2.68***	0.28			
	Difference	1278	2.68***	0.44	0.72	0.48	0.97

***<.001, **<.01, *<.05; +Minnesota Reading Corps

What is the effect of the Minnesota Reading Corps program on 4- and 5-year old students' letter sound fluency?

The Minnesota Reading Corps program had a significant and large effect on 4- and 5-year old PreK students' *letter sound fluency* scores between Fall benchmark (September 2013) and Spring benchmark (May 2014). As shown in Table IV.1 above, both groups of students' letter sound fluency scores increased significantly from Fall to Spring, however by the end of the school year, PreK students in a Minnesota Reading Corps classroom were able to produce an average of 3.8 more letter sounds correctly in a one-minute period than PreK students in a comparison classroom. This represents a large effect size of about .71 standard deviations. Furthermore, as shown in Figure IV.1 below, by the end of the school year, the Minnesota Reading Corps PreK students' average score of 10.6 letter sounds was above the Spring benchmark of 10, whereas the comparison PreK students' average score of 6.8 letter sounds was well below the benchmark.

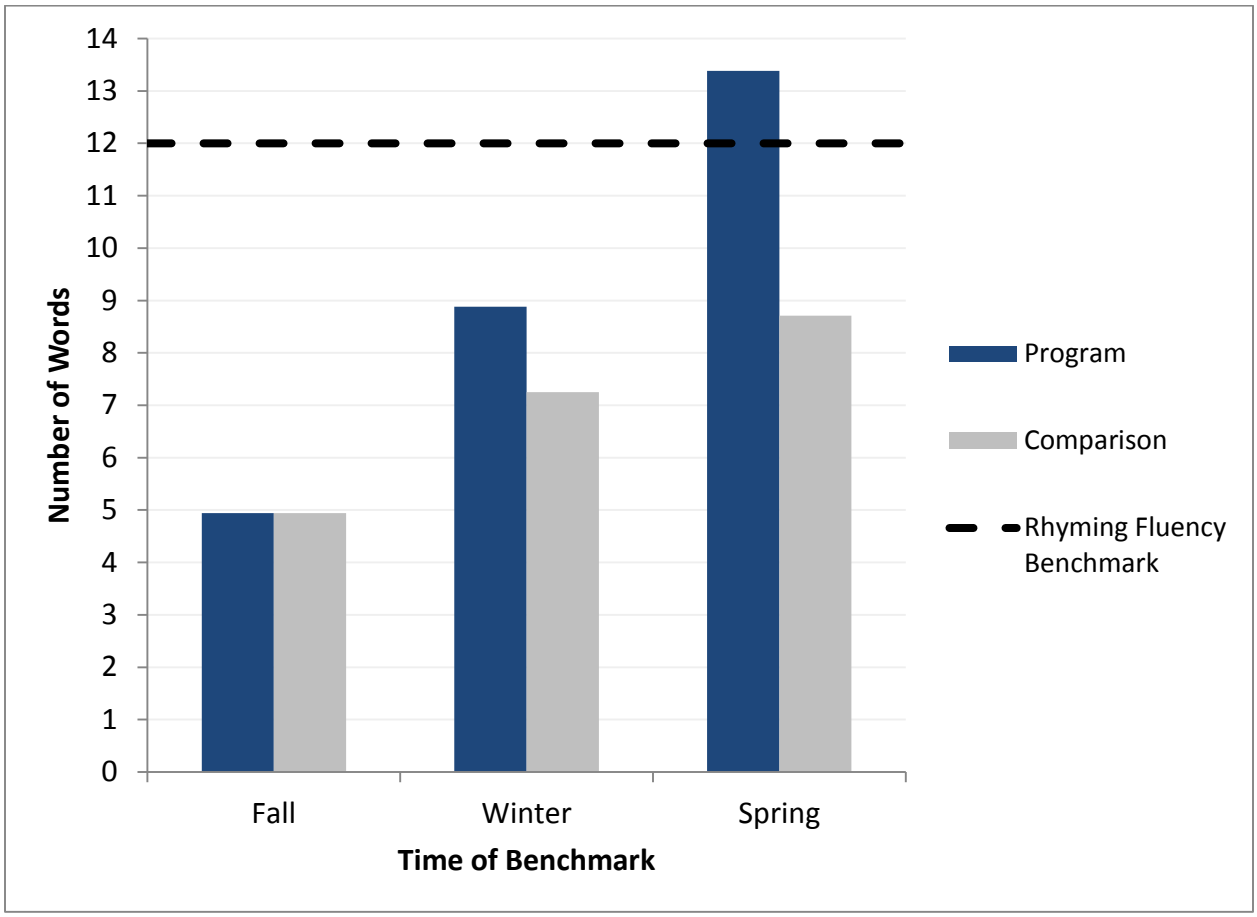
Figure IV.1. Growth in Letter Sound Fluency for 4- and 5-year old PreK program and comparison students



What is the effect of the Minnesota Reading Corps program on 4- and 5-year old students' rhyming fluency?

In addition to letter sounds, 4- and 5-year old PreK students in Minnesota Reading Corps classrooms had significantly higher scores in *rhyming fluency* at the end of the school year than did PreK students in comparison classrooms. Table IV.1 shows that both groups of students' rhyming fluency scores increased significantly from Fall to Spring, however by the end of the school year PreK students in Minnesota Reading Corps classrooms were able to identify an average of 2.1 more rhymes in a two minute period than PreK students in comparison classrooms. This represents a large effect size of about 0.66 standard deviations. Figure IV.2 shows that once again the Minnesota Reading Corps PreK students' average score (13.4) reached the Spring benchmark of 12 words, while the comparison students' average score (8.7) did not reach benchmark by the end of the school year.

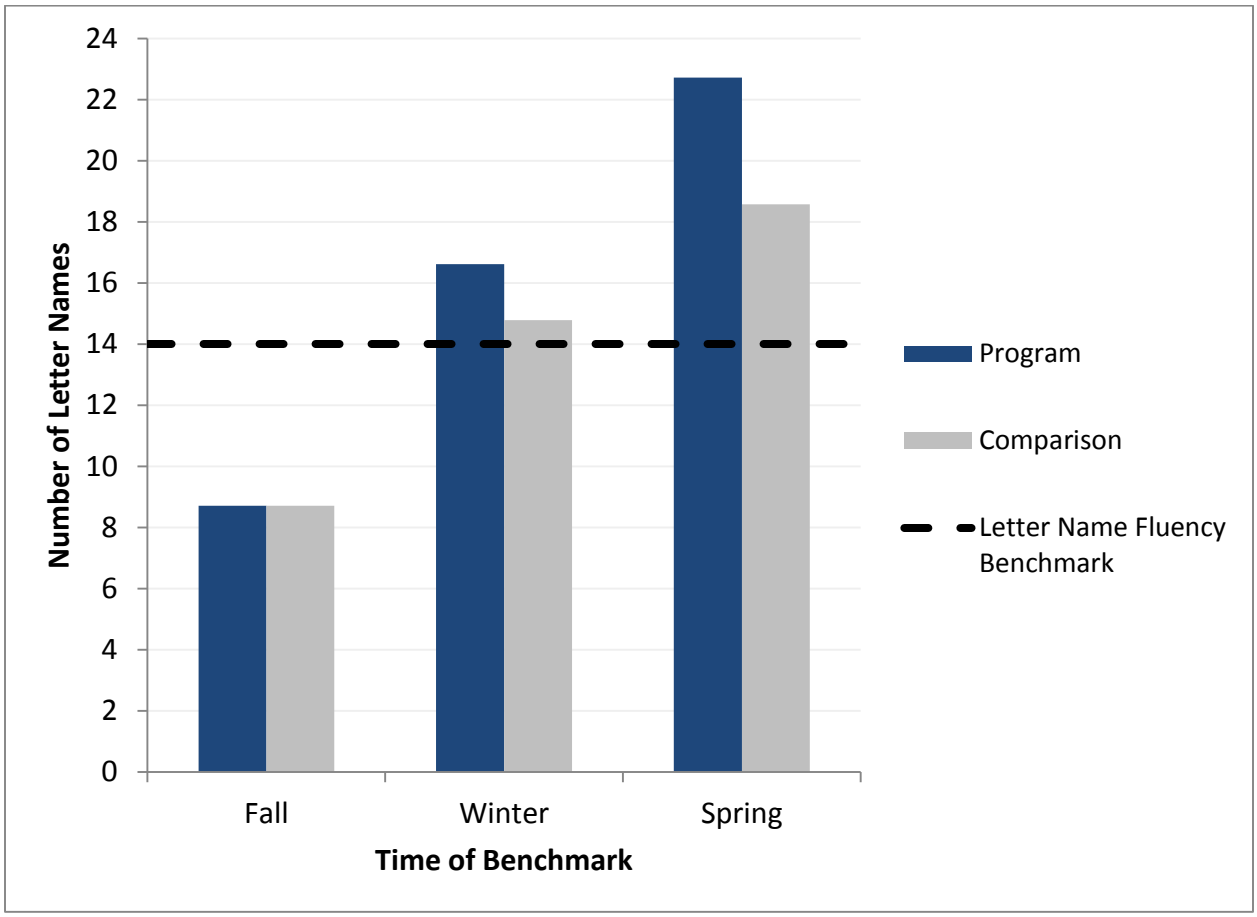
Figure IV.2. Growth in Rhyming Fluency for 4- and 5-year old PreK program and comparison students



What is the effect of the Minnesota Reading Corps program on 4- and 5-year old students' letter name fluency?

As with letter sound fluency and rhyming fluency, a significant effect was also observed in *letter name fluency* among 4- and 5-year old PreK students in Minnesota Reading Corps classrooms. By the end of the school year, both groups of students' letter name fluency scores increased significantly from Fall, however PreK students in Minnesota Reading Corps classrooms were able to identify an average of 4.2 more letters correctly in a one minute period than PreK students in comparison classrooms. This represents a considerable effect size of about .40 standard deviations. One noticeable difference between the findings on letter name fluency and other outcome measures is the performance of the 4- and 5-year old PreK students in the comparison group (shown in Figure IV.3). In this case, 4- and 5-year old PreK students in both Minnesota Reading Corps and comparison classrooms produced an average letter name fluency score (22.7 and 18.6, respectively) which well exceeded the Spring benchmark of 14 letters.

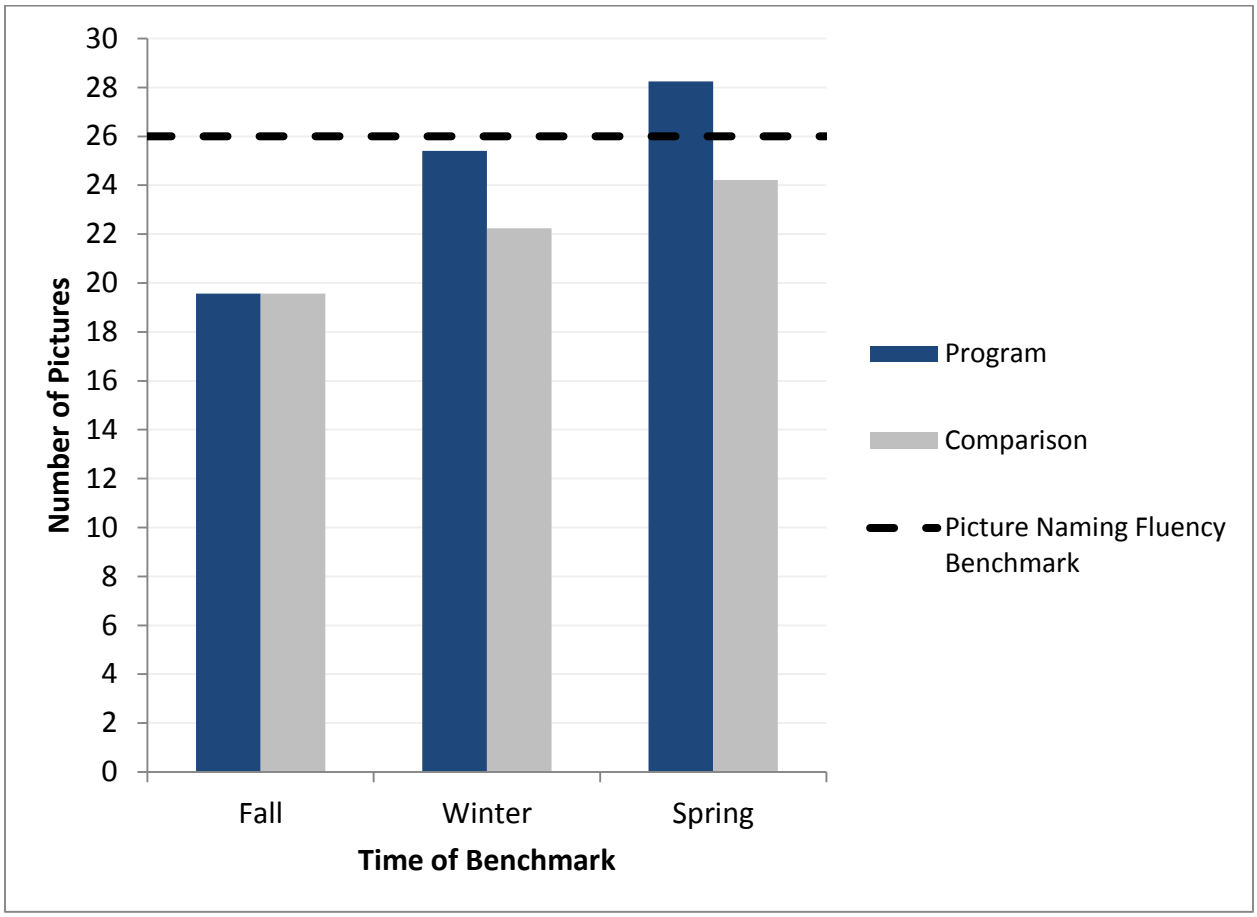
Figure IV.3. Growth in Letter Name Fluency for 4- and 5-year old PreK program and comparison students



What is the effect of the Minnesota Reading Corps program on 4- and 5-year old students' picture name fluency?

The Minnesota Reading Corps program also had a significant effect on 4- and 5-year old PreK students' *picture name fluency* scores between Fall and Spring benchmark. By the end of the school year, both groups of students' picture name fluency scores increased significantly from Fall, however PreK students in Minnesota Reading Corps classrooms were able to identify an average of 4.0 more pictures correctly in a one minute period than PreK students in comparison classrooms. As with the other outcome measures, this difference represents a substantial effect size of about .49 standard deviations. Figure IV.4 below shows that, by the end of the school year, the Minnesota Reading Corps PreK students' average score of 28.3 pictures was above the Spring benchmark of 26, whereas the comparison PreK students' average score of 24.2 pictures was just below benchmark.

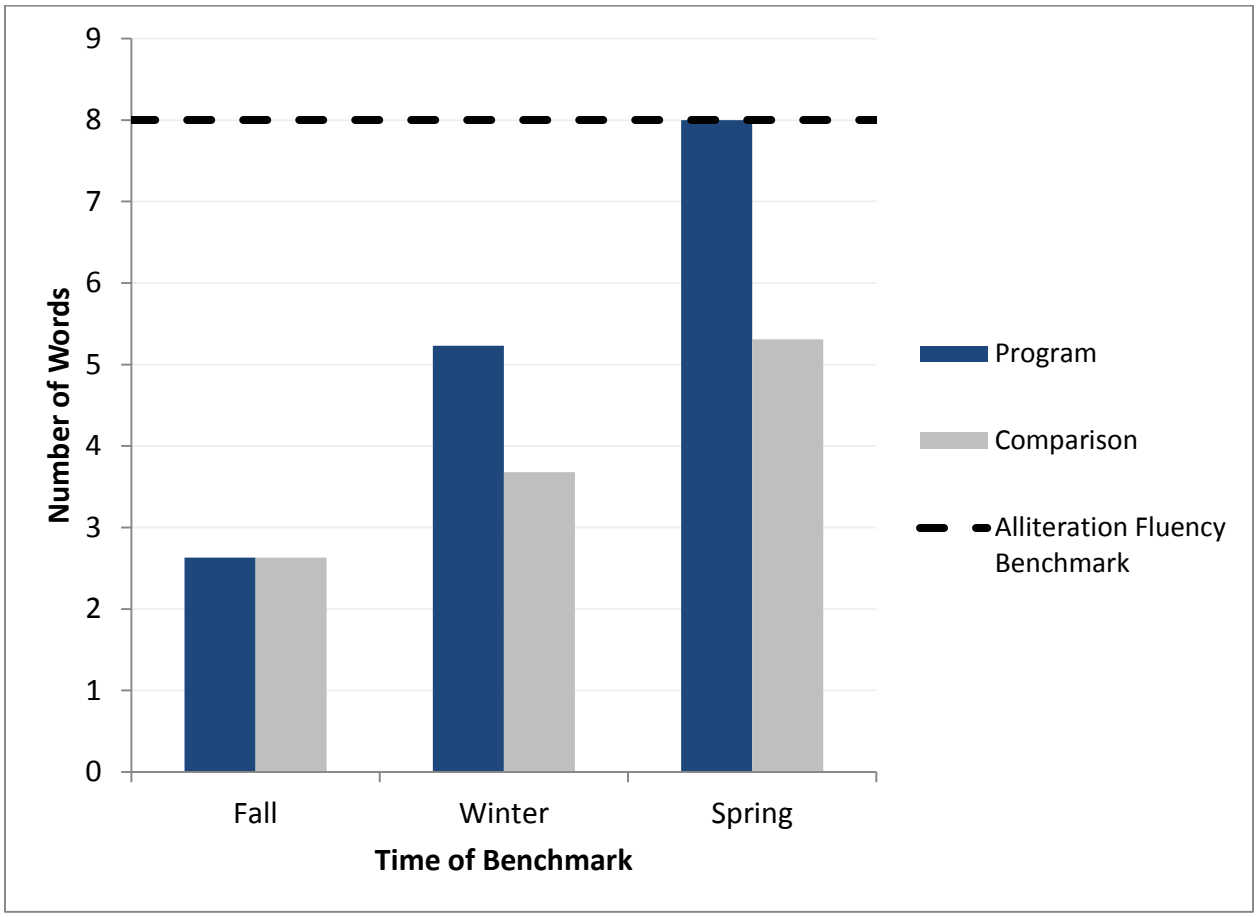
Figure IV.4. Growth in Picture Name Fluency for 4- and 5-year old PreK program and comparison students



What is the effect of the Minnesota Reading Corps program on 4- and 5-year old students' alliteration fluency?

The final outcome examined for 4- and 5- year old students was *alliteration fluency*, the ability to identify words beginning with the same letter sound (e.g., cat and car). Between Fall and Spring benchmark, both groups of students' alliteration fluency scores increased significantly, however PreK students in Minnesota Reading Corps classrooms were able to identify an average of 2.7 more alliterations correctly in a two minute period than PreK students in comparison classrooms. This represents a large effect size of about .72 standard deviations. Furthermore, as shown in Figure IV.5 below, by the end of the school year, the Minnesota Reading Corps PreK students' average score of 8.0 alliterations reached the Spring benchmark of 8, whereas the comparison PreK students' average score of 5.3 sounds was well below the benchmark.

Figure IV.5. Growth in Alliteration Fluency for 4- and 5-year old PreK program and comparison students



Overall Findings for 3-year Old Students

The Minnesota Reading Corps PreK program had a statistically significant and positive effect on 3-year old students' emergent literacy skills on two of the four IGDI measures developmentally appropriate for 3-year old students.[46] As described in Chapter II, similar assessments were administered to the 3-year old PreK students as for 4- and 5-year old students, with the exception of letter sound fluency, which is not considered developmentally appropriate for 3-year old children. Also, the letter name assessment for 3-year old students was untimed.[47]

Our analysis was conducted by age, due to developmental differences between 3-year old PreK students and 4- and 5-year old PreK students. However, it is important to note the substantially smaller sample size for the analysis of 3-year old students' emergent literacy outcomes compared to that for 4- and 5-year old students. Smaller sample sizes substantially reduce the power to detect statistically significant differences, and the study was not designed to conduct these analyses with sufficient power. The lower sample size for 3-year old students is due to the fact that most Minnesota Reading Corps sites had classrooms

[46] Letter sound fluency was not administered to 3-year old students.

[47] As mentioned previously, the 4- and 5- year old version of the letter name assessment was a fluency measure.

that either only enrolled 4- and 5-year old students or a mix of 3-, 4-, and 5-year old students. Thus, these smaller sample sizes are one possible explanation for the lack of significance found on two of the four IGDI measures.

Below we provide a discussion of the findings for 3-year old students, and **Table IV.1** presents a summary of the data. As we did for the 4- and 5-year old findings above, several figures are provided, which show the average scores on the Fall, Winter, and Spring benchmarks for PreK students in Minnesota Reading Corps program and comparison classrooms.

Table IV.2. Average Growth Among 3-Year Old PreK Students by Spring

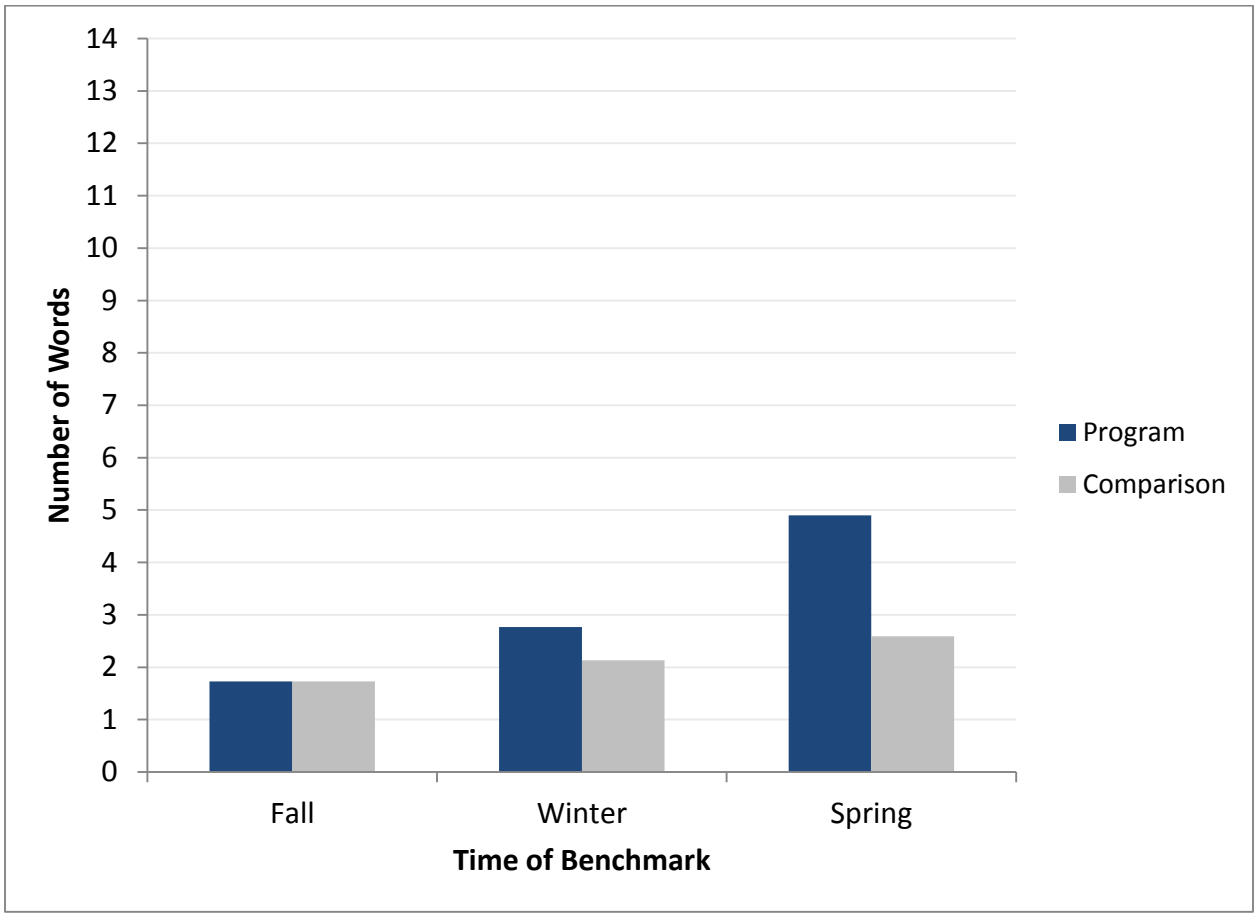
IGDI Assessment	Treatment Assignment	N	Average Growth	SE	Effect Size	Confidence Interval	
Rhyming Fluency	Program+	193	3.17***	0.35			
	Comparison	114	0.86	0.48			
	Difference	307	2.30***	0.37	0.43	0.28	0.59
Letter Name Recognition	Program	194	6.52***	0.50			
	Comparison	115	5.11***	1.02			
	Difference	309	1.41	1.41	-	-	-
Picture Name Fluency	Program	196	6.94***	0.44			
	Comparison	105	3.43**	0.88			
	Difference	301	3.52**	1.06	0.42	0.14	0.71
Alliteration Fluency	Program	189	1.96***	0.22			
	Comparison	189	0.54	0.66			
	Difference	281	1.43	0.68	-	-	-

***<.001, **<.01, *<.05; +Minnesota Reading Corps

What is the effect of the Minnesota Reading Corps program on 3-year old students' rhyming fluency?

The Minnesota Reading Corps program had a significant and large effect on 3-year old PreK students' *rhyming fluency* scores between Fall benchmark (September 2013) and Spring benchmark (May 2014). As shown in Table IV.2 above, by the end of the school year, PreK students in Minnesota Reading Corps classrooms could identify an average of 2.3 more rhyming words correctly in a two minute period than PreK students in comparison classrooms. This represents a substantial effect size of about .43 standard deviations. Although we provide an analysis of students' progress relative to the benchmark target scores for the 4- and 5-year old PreK students, due to the limited research on appropriate target scores for 3-year old students, we focused on growth only at that age level. However, it is worth noting in Table IV.2 above that the 3-year old students in Minnesota Reading Corps program classrooms demonstrated significant growth between Fall and Spring Benchmark while students in the comparison classrooms did not.

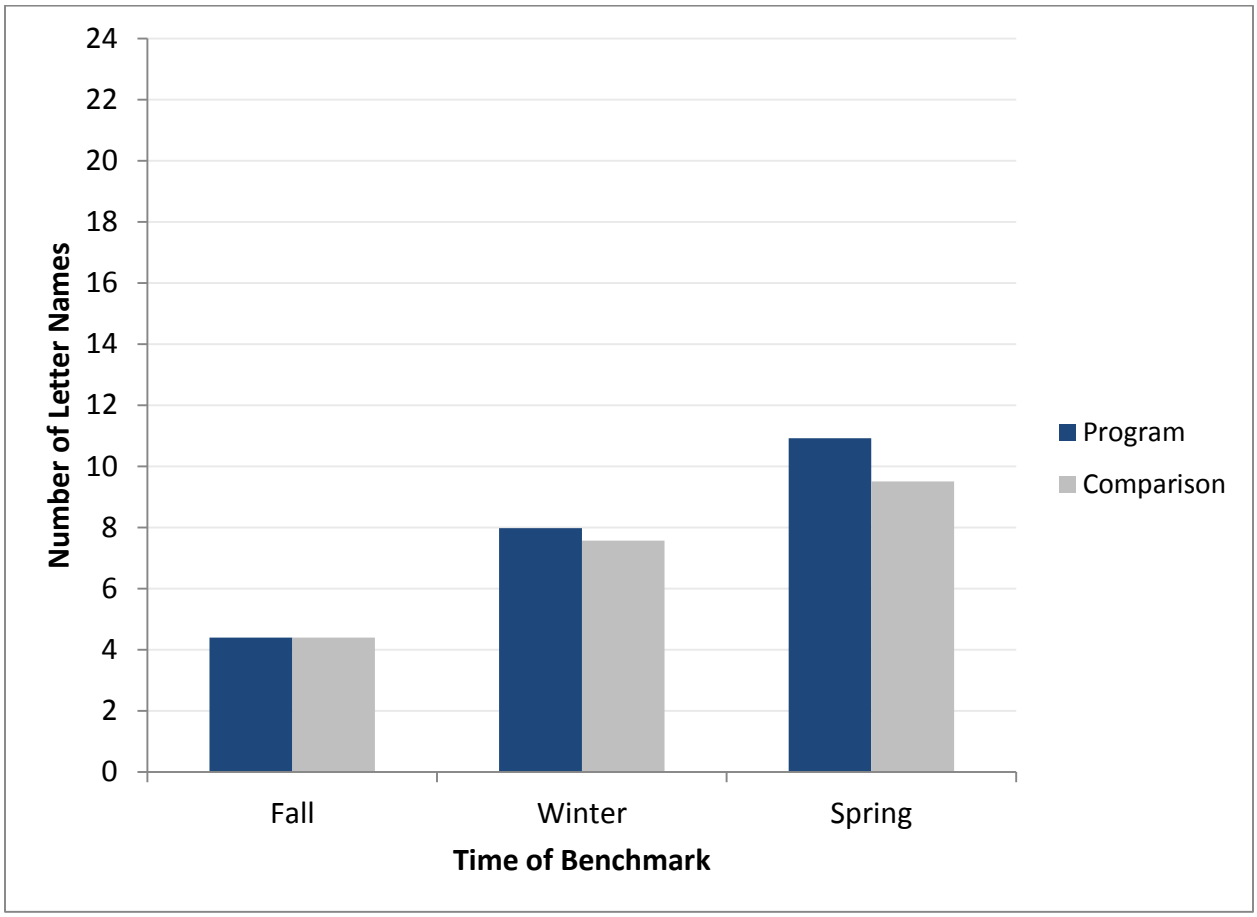
Figure IV.6. Growth in Rhyming Fluency for 3-year old PreK program and comparison students



What is the effect of the Minnesota Reading Corps program on 3-year old students' letter name recognition?

Although large growth effects were found for 3-year old students in rhyming fluency, 3-year old PreK students in Minnesota Reading Corps classrooms did not attain significantly higher *letter name recognition* scores at Spring benchmark than did PreK students in comparison classrooms. By the end of the school year, the 3-year old Minnesota Reading Corps PreK students correctly identified an average of 1.4 more letters than PreK students in comparison classrooms. PreK students in both Minnesota Reading Corps program and comparison classrooms experienced significant growth between Fall and Spring benchmark in their average letter name recognition scores (6.5 and 5.1 letter names, respectively). Also, the average scores at Spring benchmark for 3-year old students in Minnesota Reading Corps program and comparison classrooms, shown in Figure IV.7, were similar (10.9 and 9.5, respectively).

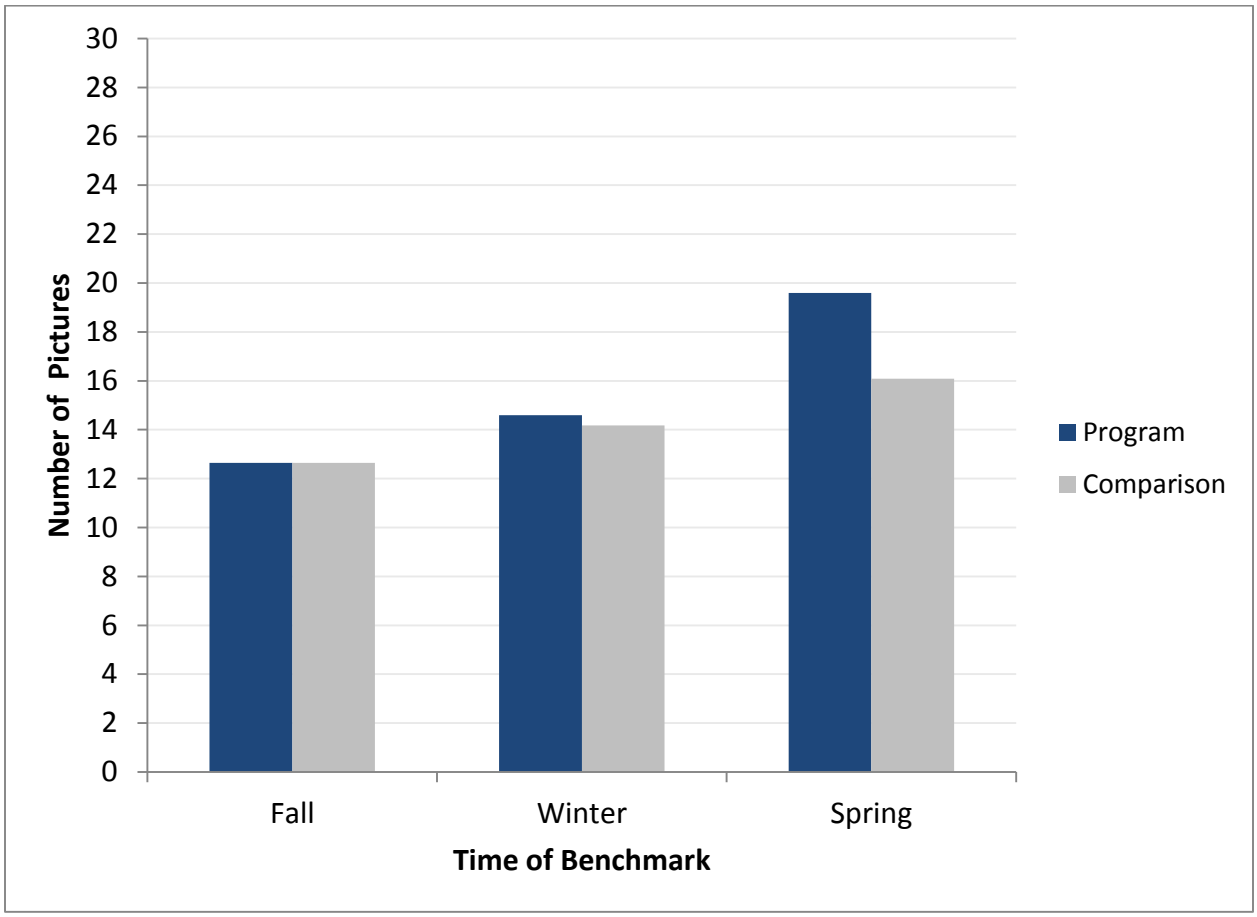
Figure IV.7. Growth in Letter Name Recognition for 3-year old PreK program and comparison students



What is the effect of the Minnesota Reading Corps program on 3-year old students' picture naming fluency?

Three year old PreK students in Minnesota Reading Corps classrooms attained significantly higher growth in *picture naming fluency* scores between Fall and Spring benchmark than did PreK students in comparison classrooms. The picture naming assessment measures child vocabulary and is an important indicator of future reading comprehension proficiency. As shown in Table IV.2, by the end of the school year, the 3-year old Minnesota Reading Corps program students correctly identified twice as many picture names as PreK students in comparison classrooms (6.9 and 3.4, respectively), resulting in a difference of 3.5 more pictures named correctly. Similar to rhyming fluency, this represents a substantial effect size of about .42 standard deviations.

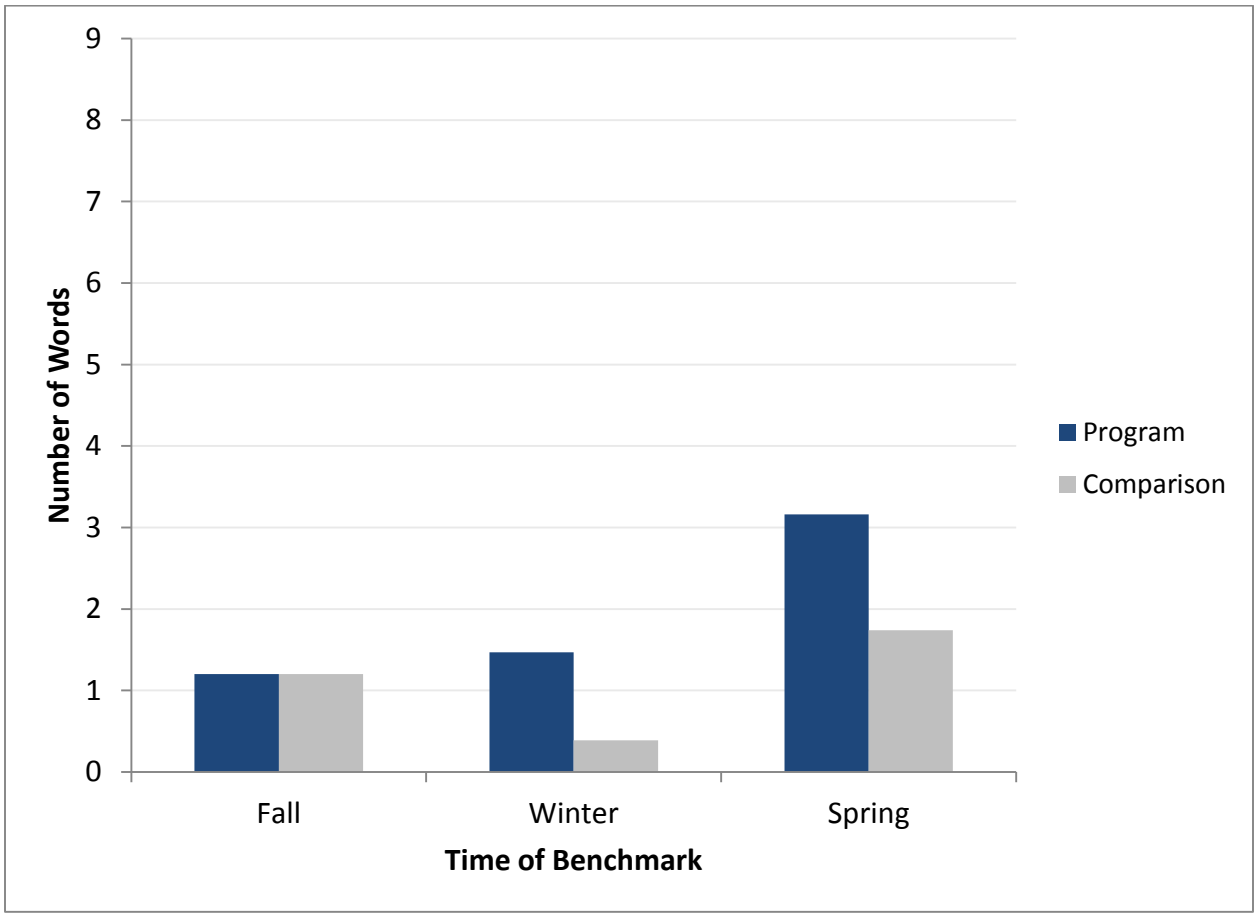
Figure IV.8. Growth in Picture Name Fluency for 3-year old PreK program and comparison students



What is the effect of the Minnesota Reading Corps program on 3-year old students' alliteration fluency?

For the final outcome measure of *alliteration fluency*, 3-year old PreK students in Minnesota Reading Corps classrooms did not experience significantly higher growth in scores between Fall and Spring benchmarks than did PreK students in comparison classrooms. By the end of the school year, the 3-year old Minnesota Reading Corps PreK program students correctly identified an average of 1.4 more alliterative words than PreK students in comparison classrooms. Importantly, while the difference in growth between program and control sites was not significantly different, Table IV.2 above shows that the 3-year old students in Minnesota Reading Corps classrooms demonstrated significant growth from Fall to Spring Benchmark, whereas students in the comparison classrooms did not. Also, the average alliteration fluency score at Spring benchmark for 3-year old students in Minnesota Reading Corps classrooms, shown in Figure IV.7, is almost twice as high as the average for students in comparison classrooms (3.1 and 1.7, respectively).

Figure IV.9. Growth in Alliteration Fluency for 3-year old PreK program and comparison students



Findings by Major Demographic Groups

Our findings include a set of subgroup analyses of student study participants. The evaluation team identified subgroups for further examination based on the major demographic groups generally of interest in education research and also of interest to CNCS and the Minnesota Reading Corps program. We provide results by gender, race/ethnicity, and Dual Language Learner (DLL) status.[48] Subgroups were defined based on characteristics provided at baseline and each level was determined by individual characteristics (e.g., male vs. female; White and non-White; DLL vs. non-DLL).

Below the evaluation team provides two types of subgroup analysis. First, we added the identified moderators to the ANCOVA model and jointly tested the effects to determine if there are differential results across subgroups for 4- and 5-year old students, implying that the Minnesota Reading Corps PreK program may be more or less beneficial for selected subgroups of students.[49]

[48]We did not examine students by Free and Reduced Price Lunch (FRPL) status, which is a measure of socio-economic status, because these data are not often collected on preschool children; however, the majority of our sample attended schools with high percentages of children with FRPL status, so it is reasonable to assume that the majority of the children in our study would likely meet the eligibility criteria for FRPL.

[49] Due to small sample sizes, subgroup analyses were not conducted for 3-year old students.

Results from the first set of subgroup statistical tests are provided in **Table IV.3** below. The results show no statistically significant differences in the effect of the program for most subgroup variables across outcome measures, with the exception of DLL for picture naming. That is, the Minnesota Reading Corps PreK program is equally effective for both boys and girls, White and non-White students, and Dual Language Learners or English speaking students. One difference was found between non-DLL and DLL students for picture name fluency, where DLL students appear to have benefited from the program more so than non-DLL students on this outcome.

Table IV.3. Moderator effects of subgroup variables on 4- and 5-year old PreK students by Spring

IGDI Fluency Assessment	Gender (Female)	Race/Ethnicity (Non-White)	Dual Language Learner (DLL)
Letter Sounds	**1.04** (N=511)	**0.01** (N=242)	**1.14** (N=127)
Rhyming	**-0.16** (N=578)	**1.07** (N=289)	**1.16** (N=147)
Letter Names	**-0.39** (N=587)	**2.52** (N=289)	**0.33** (N=148)
Picture Names	**1.11** (N=580)	**2.26** (N=289)	**3.65**** (N=148)
Alliteration	-0.69 (N=522)	-0.24 (N=241)	-1.18 (N=128)

**<.01

For the second subgroup analysis, we subdivided the 4- and 5-year old data by major subgroup (e.g., males, females, etc.), estimated the differences between the Minnesota Reading Corps program and comparison groups, and conducted significance testing to examine differences in patterns of findings by major subgroup. The results from this second subgroup analysis should be interpreted with caution, in particular when the results are not significant because sub-sectioning the data results in much smaller sample sizes than may be sufficient to detect differences between the program and comparison groups. As discussed earlier, smaller sample sizes substantially reduce the power to detect statistically significant differences, and the study was not designed to conduct these analyses with sufficient power. The results of both subgroup analyses are presented below.

Gender

Both types of subgroup analyses found no differences in the effects of the program for male and female students. The moderator test presented in **Table IV.3** above showed no significant differences in effects by gender for 4- and 5-year old students across all five literacy measures (*letter sound fluency; rhyming fluency, letter name fluency, picture name fluency*, and *alliteration fluency*). When the sample was segmented by gender, significant findings persisted for 4- and 5-year old students for both males and females. Furthermore, **Table IV.4** shows that the average difference between the program and comparison groups at Spring benchmark were relatively similar for males and females. Although differences between 4- and 5-year old students in Minnesota Reading Corps classrooms compared to students in comparison classrooms were slightly higher for female than male students in *letter sound fluency* and *picture name fluency*, most of the five outcome measures show similar amounts of growth in emergent literacy skills across both gender subgroups.

Table IV.4. Average growth among male and female 4- and 5-year old PreK students by Spring

IGDI Fluency Assessment	Treatment Assignment	Male Students			Female Students		
		N	Average Growth	SE	N	Average Growth	SE
Letter Sounds	Program+		7.54***	0.33		8.95***	0.44
	Comparison		4.23***	0.63		4.60***	0.78
	Difference	583	3.31**	0.89	511	4.35***	1.15
Rhyming	Program		6.83***	0.32		7.77***	0.33
	Comparison		3.22***	0.50		4.32***	0.35
	Difference	641	3.62***	0.71	578	3.45***	0.59
Letter Names	Program		13.14***	0.48		14.94***	0.61
	Comparison		8.78***	0.85		10.96***	0.92
	Difference	648	4.36**	1.20	587	3.98*	1.44
Picture Names	Program		8.58***	0.37		8.79***	0.00
	Comparison		5.09***	0.50		4.20***	0.48
	Difference	642	3.49***	0.71	580	4.59***	0.66
Alliteration	Program		4.97***	0.29		5.78***	0.31
	Comparison		1.97***	0.50		3.46***	0.53
	Difference	588	3.00***	0.71	522	2.32**	0.76

***<.001, **<.01, *<.05; +Minnesota Reading Corps

Race/Ethnicity

Due to small sample sizes for individual racial and ethnic subgroups, we conducted our analysis by examining differences between White and non-White students, which allowed us to collapse all minority groups into one subgroup category. In our initial test, where we examined whether race/ethnicity is a significant moderator of program effects, we found that race/ethnicity was not a significant factor in explaining variations in all five of the student outcomes for 4- and 5-year old students.

Consistent with this finding, few differences were found in the patterns of effects when we subgrouped the sample into White and non-White and compared these findings to the subgroup analysis of moderator effects. **Table IV.5** shows significant average growth on four of the five outcome measures (all except letter sound fluency) among 4- and 5-year old students in Minnesota Reading Corps PreK classrooms compared to similar students in comparison classrooms, despite White or non-White subgroup membership. Despite a significant finding for White students and no significant finding for non-White students, the differences in actual growth in letter sound fluency between students in Minnesota Reading Corps classrooms and those in comparison classrooms is about the same among White and non-White students (3.5 in both subgroups). Therefore, the lack of significance in letter sound fluency among non-White students is most likely due to the smaller sample size for this subgroup compared to White students (N=242 and N=807, respectively).

Although the findings were statistically significant for both White and non-White students on four out of the five outcomes measured, it is also worth noting that larger average differences in growth were found between non-White students in Minnesota Reading Corps program classrooms and comparison classrooms compared to White students in Minnesota Reading Corps program and comparison classrooms across most measures. Therefore, the Minnesota Reading Corps program appears to have produced greater gains among non-White students relative to White students. Differences in outcomes were particularly evident in *picture name fluency,* a critically important measure of child vocabulary and a strong predictor of future reading comprehension proficiency. Non-White 4- and 5-year old students in Minnesota Reading Corps program classrooms achieved a larger amount of growth in letter name fluency (5.7 more letter names among non-White students compared to 3.2 more letters among White students) and picture name fluency (5.9 more picture names among non-White students compared to 3.6 more pictures among White students) compared to White students.

Table IV.5. Average growth among White and non-White 4- and 5-year old PreK students by Spring

IGDI Fluency Assessment	Treatment Assignment	White Students			Non-White Students		
		N	Average Growth	SE	N	Average Growth	SE
Letter Sounds	Program+	807	8.16***	0.32	242	**8.07*** **	**1.38**
	Comparison		4.65***	0.59		**4.55****	**1.73**
	Difference		3.51***	0.87		**3.52**	**2.60**
Rhyming	Program	874	7.66***	0.32	289	**6.27*** **	**0.61**
	Comparison		4.34***	0.44		**1.89***	**0.71**
	Difference		3.32***	0.70		**4.39*** **	**0.99**
	Program		13.90***	0.53		**14.24*** **	**1.12**

Letter Names	Comparison		10.72***	0.94		**8.54*** **	**2.53**
	Difference	892	3.18*	1.40	289	**5.70****	**2.94**
	Program		9.00***	0.32		**7.85*** **	**0.96**
Picture Names	Comparison		5.40***	0.50		**2.00**	**0.94**
	Difference	877	3.59***	0.75	289	**5.85*** **	**1.37**
	Program		5.64***	0.24		**4.59*** **	**0.59**
Alliteration	Comparison		2.84***	0.36		**2.03****	**1.09**
	Difference	823	2.80***	0.55	241	**2.56*** **	**1.48**

***<.001, **<.01, *<.05; +Minnesota Reading Corps

Dual Language Learners

Some differences in the effects of the program were found in both subgroup analyses for DLL and non-DLL students. The moderator test showed no significant differences in effects by DLL status for 4- and 5-year old students in four of the five emergent literacy measures. Only one outcome measure, *picture name fluency*, was significant (p<.01).

When the student sample was divided into DLL and non-DLL, significant findings persisted for 4- and 5-year old students for both DLL and non-DLL on two of five measures. **Table IV.6** shows that the average difference between the Minnesota Reading Corps program and comparison groups at Spring benchmark were significant for DLL and non-DLL students in *rhyming* and *picture name fluency*. The significance for picture name fluency may appear to contradict the finding from the first subgroup analysis, which indicates that DLL status is a significant moderator of program effects in picture naming. However, the substantial difference in size of the effect (difference) by subgroup (3.8 for non-DLL and 7.5 for DLL) are likely responsible for the significant finding in the moderator test. Growth in picture name fluency scores is particularly important for DLL students, as it is a measure of English vocabulary.

Outcome measures in *letter sound fluency, letter name fluency,* and *alliteration* were significant for non-DLL students, but not for DLL students. However, on all three of these measures, students who attended Minnesota Reading Corps PreK sites were found to grow significantly more over the course of the year than their peers at comparison sites. Therefore, substantially smaller sample sizes for DLL students compared to non-DLL students may be a contributing factor to the lack of significance found on these measures.

Table IV.6. Average growth among DLL and non-DLL 4- and 5-Year old PreK students by Spring

IGDI Fluency Assessment	Treatment Assignment	Non-DLL Students			DLL Students		
		N	Average Growth	SE	N	Average Growth	SE
Letter Sounds	Program+		8.27***	0.30		**8.17*** **	**1.38**
	Comparison		4.54***	0.56		**3.3**	**1.73**
	Difference	967	3.73***	0.83	127	**4.87**	**2.60**
	Program		7.55***	0.26		**6.05*** **	**0.61**

Rhyming	Comparison		4.03***	0.36		**1.37**	**0.71**
	Difference	1072	3.52***	0.57	147	**4.68*** **	**0.99**
Letter Names	Program		14.08***	0.49		**13.70*** **	**1.12**
	Comparison		9.94***	0.78		**9.22** **	**2.53**
	Difference	1087	4.14**	1.20	148	**4.47**	**2.94**
Picture Names	Program		8.94***	0.31		**8.22*** **	**0.96**
	Comparison		5.13***	0.43		**0.76**	**0.94**
	Difference	1074	3.81***	0.69	148	**7.46*** **	**1.37**
Alliteration	Program		5.57***	0.18		**3.8*** **	**0.59**
	Comparison		2.71***	0.29		**2.11**	**1.09**
	Difference	982	2.86***	0.43	128	**1.68**	**1.48**

***<.001, **<.01, *<.05; +Minnesota Reading Corps

Site Level Effects

An additional analysis of interest to CNCS is the examination of whether student assessment scores varied as a function of the type of site the student attended (i.e., public school or Head Start center).[50] We were only able to examine differences for public schools and Head Start programs because only one pair of schools in the sample (one program and one comparison school) was community-based. For this analysis, we used a similar approach as for the second subgroup analysis for student-level demographics, whereby we subdivided the 4- and 5-year old data by school type (public school or Head Start center), estimated the differences between program and comparison groups, and conducted significance testing. Finally, we examined whether student outcomes varied by site by calculating an intraclass correlation (ICC) across pairs of matched sites (program and comparison).

Site Type

As shown in **Table IV.7**, significant effects of the program were found regardless of the type of site where the Minnesota Reading Corps program was being implemented. Students attending Minnesota Reading Corps classrooms in both public schools and Head Start centers showed significantly higher growth across all five outcome measures than their peers in comparison classrooms. While most differences on individual outcome measures were similar, 4- and 5-year old students in Head Start centers tended to show greater growth in *letter name fluency* than average public school students in Minnesota Reading Corps classrooms (6.2 and 3.5 letter names, respectively) relative to their peers in comparison classrooms. That said, the standard error for the difference in letter name fluency between program and comparison classrooms was comparatively large, suggesting significant variability in this outcome across sites.

Also of interest, students attending Minnesota Reading Corps Head Start Centers demonstrated significantly greater growth in *letter sound fluency* and *alliteration fluency* than peers at comparison Head Start Centers. Students at Minnesota Reading Corps

[50] It is important to note that students enrolled in Head Start centers must be eligible for Free and Reduced Price Lunch (FRPL), a measure of poverty; whereas, public school students vary in their eligibility for FRPL. As such, children attending Head Start programs may be qualitatively different than those enrolled in public school programs.

Head Start program sites identified significantly more letter sounds by the end of the school year than at the beginning (7.07), whereas students at Head Start comparison sites did not identify significantly more letter sounds from the beginning of the school year (2.14). Likewise, students at Minnesota Reading Corps Head Start program sites identified significantly more alliterations by the end of the school year than at the beginning (4.78), whereas as students at Head Start comparison sites did not (1.13). These results show that the Minnesota Reading Corps program significantly improved growth in letter sound fluency and alliteration fluency at Head Start sites.

Table IV.7. Average growth among 4 and 5-Year old PreK students at Public Schools and Head Start Centers by Spring

IGDI Fluency Assessment	Treatment Assignment	Public School			Head Start Center		
		N	Average Growth	SE	N	Average Growth	SE
Letter Sounds	Program+		8.44***	0.45		7.07***	0.42
	Comparison		4.86***	0.68		2.14	1.32
	Difference	841	3.58**	1.13	211	4.93**	1.28
Rhyming	Program		7.40***	0.31		7.14***	0.3
	Comparison		3.66***	0.39		3.79***	0.56
	Difference	919	3.74***	0.67	248	3.35**	0.83
Letter Names	Program		14.07***	0.58		14.5***	0.85
	Comparison		10.61***	0.89		8.32***	1.27
	Difference	937	3.47*	1.46	245	6.18*	2.11
Picture Names	Program		8.83***	0.38		8.42***	0.37
	Comparison		4.78***	0.45		3.52**	0.61
	Difference	921	4.05***	0.82	249	4.91**	0.93
Alliteration	Program		5.46***	0.22		4.78***	0.26
	Comparison		3.03***	0.29		1.13	0.88
	Difference	855	2.43***	0.49	211	3.65*	1.13

***<.001, **<.01, *<.05; +Minnesota Reading Corps

Site Pair-Level ICCs

An additional analysis of interest to CNCS is the examination of whether student differences in growth varied as a function of the site pair (program or comparison) they attended. We examined this question by calculating site pair-level intraclass correlations (ICC) using the differences in students' Spring benchmark scores to determine whether the student outcome data indicated substantial variation in site pair-level effects. Intraclass correlations measure the portion of the total variation in an outcome that is associated with various levels of a variable, such as site assignment. In this case, the site pair-level ICC measures the degree to which students within the same site pair (program and comparison) correlate on their program effects (i.e., differences in growth).

As shown in **Table IV.8**, the site pair-level ICCs are relatively low or not significant, indicating they are not meaningful. The ICCs for program effects vary by outcome measure, with the only statistically reliable ICCs found among 4- and 5-year old students in

letter sound fluency, picture name fluency, and alliteration fluency. However, the ICCs are relatively small at .06, .06, and .04, respectively. Therefore, it is possible to conclude that there is no significant variation in program effects across pairs of sites.

Table IV.8. Site pair intraclass correlations for Spring-Fall differences

IGDI Fluency Assessment	3-year old students (N= 286)		4- and 5-year old students (N= 1,480)	
	ICC	SE	ICC	SE
Letter Sounds	-	-	0.055*	0.022
Rhyming Fluency	0.011	0.025	0.026	0.013
Letter Names	0.001	0.017	0.083	0.029
Picture Names	0.047	0.036	0.060*	0.023
Alliteration	0.046	0.036	0.038*	0.017

Conclusions

The findings from the Minnesota Reading Corps PreK outcome evaluation provide important evidence for addressing the studies' key research questions (presented in Chapter III). Below, the evaluation team offers our conclusions based on these findings and organizes them by major research questions. Following our assessment of the questions is a discussion on the implications of our findings for the Minnesota Reading Corps program.

1. What is the effect of the Minnesota Reading Corps program on student literacy outcomes?

The results of our analysis showed that preschool students who attended Minnesota Reading Corps classrooms achieved significantly higher emergent literacy assessment scores by the end of the school year than did students who did not attend a Minnesota Reading Corps classroom (see Chapter IV for more detail on these findings). The Minnesota Reading Corps PreK program had statistically significant and large effects across all five IGDI outcome measures of emergent literacy skills for 4- and 5-year old students and on two of the four IGDI measures appropriate for assessing 3-year old students.

The Minnesota Reading Corps PreK program had statistically significant effects across all five IGDI outcome measures, *letter sound and letter name fluency* (alphabet knowledge)*, rhyming fluency and alliteration fluency* (phonological awareness), and *picture name fluency* (vocabulary), for 4- and 5-year old students between Fall benchmark (September 2013) and Spring benchmark (May 2014) . In addition, substantial effect sizes were found on each measure, ranging from .40 to .72, indicating that the Minnesota Reading Corps program has a comprehensive, positive effect on students' emergent literacy skills.

Despite the substantially smaller sample size for 3-year old students, the Minnesota Reading Corps program was found to have a significant and substantial effect on 3-year old PreK students' *rhyming fluency* (phonological awareness) and *picture name fluency* (vocabulary) scores between Fall and Spring benchmark. Although growth was also found for 3-year old students on the *letter name recognition* (alphabet knowledge) and *alliteration fluency* (phonological awareness) outcome measures, 3-year old PreK students in Minnesota Reading Corps classrooms did not attain significantly higher letter name recognition and alliteration fluency scores at Spring benchmark than PreK students in comparison classrooms. The lack of statistical significance in letter name recognition is likely due to the fact that both the program and comparison PreK students experienced significant growth in their average letter name recognition scores. Letter name recognition the most widely emphasized emergent literacy skills in early childhood education. As such, it was not surprising to observe equally significant growth at both the Minnesota Reading Corps program and comparison sites.

With respect to alliteration, 3-year old PreK students in neither Minnesota Reading Corps program classrooms nor comparison classrooms experienced significant growth in their scores between Fall and Spring benchmarks. Alliteration is typically a later developing phonological awareness skill, one which teachers may wait to engage with until children master precursor skills such as rhyming. The fact that large, statistically significant effects were found in alliteration fluency among 4- and 5- year old children at Minnesota Reading Corps sites strongly suggests that the program can effectively influence this skill but that it most developmentally appropriate for children older than 3-years of age.

Overall, the results of the student outcome analysis revealed that the Minnesota Reading Corps PreK Program is achieving its goal of creating Kindergarten–ready 4- and 5-year old students, as measured against the IGDI Spring benchmarks. Of particular interest is the large, significant effect that the Minnesota Reading Corps program produces in the growth in children's oral language, specifically vocabulary as measured by the picture name fluency measure. Vocabulary is one of the strongest predictors of later reading comprehension. The Minnesota Reading Corps PreK program's attention to not only decoding skills (i.e., letter name recognition and letter sound correspondence) but also oral language skills is a key program feature and likely a primary reason for the demonstrated effectiveness of the program. As witnessed during our *Phase II PreK Process Assessment,*[51] the program's emphasis on intentionally integrating decoding and oral language skills in all aspects of daily interactions, as well as whole class, small group, and individualized instruction, results in numerous opportunities for children to connect text and language with personally meaningful content and experiences. This contextualized language and literacy instruction, as best evidenced by extended adult-child discourse and rich dialogic reading sessions, is a proven method for growing children's emergent literacy skills.

2. Does the effect on literacy outcomes vary by student characteristics/demographics?

After establishing the overall positive effect of the Minnesota Reading Corps program on preschool students' emergent literacy outcomes, we conducted analyses to examine whether differential effects of the program existed for specific subgroups of 4- and 5-year old students based on the following student characteristics: gender (male/female), race/ethnicity (White/non-White), and Dual Language Learner (DLL) status (yes/no). For the most part, students from all subgroups examined produced significant growth in emergent literacy outcomes regardless of gender, race/ethnicity, or DLL status. In the instances where differential growth rates were observed, students who attended Minnesota Reading Corps PreK sites were often found to grow significantly more over the course of the year than their peers at comparison sites. Of note, students typically at risk for not being Kindergarten-ready, non-Whites and Dual Language Learners, posted significantly greater growth in vocabulary, as measured by picture name fluency, at Minnesota Reading Corps sites than at comparison sites. In fact, the vocabulary of non-White students and DLL students at comparisons sites did not grow significantly from Fall to Spring. Given the importance of vocabulary as a powerful predictor of later reading comprehension proficiency, the significant growth among non-White and DLL students at Minnesota Reading Corps PreK sites is a promising finding. It implies that the program elements that together comprise the Minnesota Reading Corps PreK program have a significant and meaningful impact on a critical skill (vocabulary) at program sites that is otherwise unaffected at comparison sites. Thus, two key conclusions for the evaluation are that the PreK program appears to have a positive effect on all students' emergent literacy skills and that the program may be particularly effective in improving non-White and DLL students' vocabulary skills.

3. Do effects on literacy outcomes vary by site/school?

The Minnesota Reading Corps program appears to be consistently effective no matter the type of school setting in which the program occurs, either public school or Head Start center. Students enrolled at both types of PreK programs evidenced greater

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[51] Hafford, C., Markovitz, C., Hernandez, M.W., Diaconis, A., Estrera, E., & Muyskens, P. (2014). *Process Assessment of the Minnesota Reading Corps PreK Program: Phase II Extension.* (Prepared under contract to the Corporation for National and Community Service). Chicago, IL: NORC at the University of Chicago.

growth in emergent literacy outcomes at Minnesota Reading Corps program sites than comparison sites. Of note, students at Minnesota Reading Corps Head Start centers achieved significantly greater growth on letter sound fluency and alliteration fluency than their peers at comparison site Head Start centers who did not improve on these measures during the school year. These results suggest that not only is the Minnesota Reading Corps PreK program effective in both public schools and Head Start centers, but that the program may be particularly effective in developing some emergent literacy skills for students enrolled in Head Start centers.

The ICC findings indicate that the PreK program is effective across the individual sites where the students received Minnesota Reading Corps services. The low levels of variability in student outcome scores corroborate the high levels of fidelity of program implementation we observed in the *Phase II Process Assessment.*[52] The Minnesota Reading Corps program's high quality training and program resources, use of validated formative assessments (i.e., IGDIs) to inform instruction, multi-layered supervisory structure, ongoing professional development and coaching sessions, and clear, objective method for measuring fidelity (i.e., ELLCO) are key program features that have led to such low levels of variability. These results support the conclusion that the Minnesota Reading Corps program is replicable in multiple school settings.

Program Implications from Conclusions

Overall, the results of this study show that the Minnesota Reading Corps PreK program is an effective model for improving preschool students' emergent literacy skills. Specifically, 4- and 5-year old students in Minnesota Reading Corps classrooms demonstrated significantly higher growth in their emergent literacy skills compared to their peers in comparison classroom across all five literacy measures. Furthermore, 3-year old students showed significantly higher growth on two of the four IGDI measures used to assess younger students. For the most part, the program was equally effective for all students and did not vary by gender, race, or DLL status. Likewise, for the most part, no major differences by site location or school type (public school or Head Start center) were found. In instances where differences were found, they favored at-risk students (i.e., non-White students, Dual Language Learners, Head Start centers). As such, the results show that the program is both effective and highly replicable in multiple settings with different types of students.

The Minnesota Reading Corps PreK program model combines the human capital from at least 9 months of AmeriCorps service with evidence-based program elements, including a RtI approach to differentiated instruction, regular formative assessment, the Literacy Rich Schedule, the SEEDS approach to high quality adult-child interactions, and intensive small-group and one-to-one intervention with Tier 2 and 3 students.

The Minnesota Reading Corps PreK program's comprehensive nature, including both whole class instructional strategies and differentiated interventions, results in class-wide impacts. The coordination between the two forms of instruction is likely a key source of the accelerated growth we observed in student emergent literacy outcomes. As outlined in the *Phase II Process*

[52] Hafford, C., Markovitz, C., Hernandez, M.W., Diaconis, A., Estrera, E., & Muyskens, P. (2014). *Process Assessment of the Minnesota Reading Corps PreK Program: Phase II Extension.* (Prepared under contract to the Corporation for National and Community Service). Chicago, IL: NORC at the University of Chicago.

Assessment,[53] the Minnesota Reading Corps program provides a common infrastructure for coordinated, intentional instruction through the Literacy Rich Schedule, a common pedagogy for interacting with PreK students via SEEDS, and proven strategies for embedding language and literacy instruction at times during the school day that are often overlooked (e.g., arriving at the beginning of the day, lining up for bathroom breaks or the bus, transitioning between circle time and choice time). Because the Minnesota Reading Corps PreK program is comprehensive, its success requires a strong commitment from site administrators and lead teachers. Furthermore, the program is most effective when all adults in a classroom coordinate their practice; therefore, it is critical that the lead teacher understand and fully commit to the Minnesota Reading Corps PreK model.

The Minnesota Reading Corps program's use of a multi-layered supervisor structure, including site-based Internal Coaches and program-provided Master Coaches, effectively supports the implementation of such a comprehensive program. The PreK program's focus on objective methods for monitoring both student and AmeriCorps member performance (i.e., IGDI assessments and ELLCO tool, respectively) supports fidelity of program implementation and further enforces a strong commitment to continual improvement and professional development throughout the year. In sum, the complete Minnesota Reading Corps PreK program, implemented with fidelity, is both highly replicable and effective in improving diverse PreK students' emergent literacy outcomes.

Recommendations for Future Research

Future research should more deeply examine differences in student outcomes across the model used at various PreK sites. Differences in the type and mix of staff used to support a PreK program are both interesting and relevant to assisting in bringing the Reading Corps program to scale. Whether the site includes Educator Corps only, Community Corps only, or a mix of the two has potential effects on student outcomes that could not be fully explored in this analysis.

Future research should also explore the degree to which the impact of the Reading Corps model is seen in PreK sites that are relatively new to the Reading Corps (i.e., 1-3 years), versus sites that have been in the Reading Corps for a longer period time (i.e., 4+ years). The Reading Corps program provides additional intensity of service to recently established sites, and it might be helpful to the program if they could better understand at what point this additional intensity may no longer be needed, so resources can be more efficiently allocated to higher needs sites.

One difficulty in completing this study was the degree of saturation of the PreK Reading Corps model and SEEDS training across PreK sites in Minnesota. Potential comparison sites were challenging to identify, especially in the only urban area in the state (i.e., Minneapolis-St. Paul). When potentially good candidate were identified, they were often found to have been "contaminated" because the site staff had previously received SEEDS training, a foundational component of the Reading Corps model. While the widespread dissemination of the effective SEEDS training is beneficial for Minnesota preschoolers, it was a significant hurdle in identifying comparison sites for the current study. Future research could replicate this study design in other states, where the presence of the Reading Corps PreK program and prevalence of SEEDS training is less widespread. This would allow for a potentially larger sample size, permitting additional points of inquiry to explore questions such as the impact of the program in

[53] Hafford, C., Markovitz, C., Hernandez, M.W., Diaconis, A., Estrera, E., & Muyskens, P. (2014). *Process Assessment of the Minnesota Reading Corps PreK Program: Phase II Extension.* (Prepared under contract to the Corporation for National and Community Service). Chicago, IL: NORC at the University of Chicago.

year one, two, and three separately (versus later years), differences in effects across staffing models, the program's effect across a broader range of student demographics, and the effect of the program model in states with less rigorous standards for early childhood education.