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Evaluation Report on the First Year Results from the Reading Achievement Program (RAP)

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Prepared for

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Executive Summary

The Reading Achievement Program (RAP) is an initiative of The Hill Center, conducted in collaboration with the North Carolina GlaxoSmithKline Foundation and Durham Public Schools. RAP is a public school program where struggling readers are pulled out of their regular classrooms daily for short periods of time to receive specialized instruction. RTI International is evaluating this program as it is currently being implemented in Durham Public Schools. RTI has analyzed the academic achievement of the participating students as measured by various subtests of the Woodcock-Johnson Tests of Achievement and of the North Carolina End-of-Grade Tests. This summary presents the preliminary results after the first year of RAP.

What are the outcomes of RAP students on the subtests of the Woodcock-Johnson Tests of Achievement Results?

- RAP students showed statistically significant improvement on three of the four Woodcock-Johnson (WJ) reading subtests. The students reversed their pattern of falling behind in reading to progressing at a rate the same as or faster than that expected of the average student. On three out of four WJ reading subtests (Reading Fluency, Passage Comprehension, and Word Attack), students in RAP actually showed greater improvement in reading skills than is expected of an average student for their age. Their progress brought them close to (within 2 to 5 points of) the WJ's average range of 90 to 110. For the remaining WJ reading subtest (Letter-Word Identification), students in RAP progressed at the rate expected of an average student. Progressing at this rate is an accomplishment because at-risk students typically progress at a rate slower rate than other students.

What are the outcomes of RAP students on the subtests of the North Carolina End-of-Grade reading test?

- Both third- and fourth-grade RAP students showed a great deal of improvement on the reading End-of-Grade (EOG) tests. These statistically significant results are especially powerful given the low number of students in this part of the study (first and second graders do not take the EOG). Interestingly, both third- and fourth-grade RAP students also showed statistically significant improvement in the math EOG test as well. The program developers speculate that improvement in reading strengthens math performance by helping students perform better in math activities that require reading, such as word problems.

In summary, these results strongly support the premise that participation in RAP is related to an increase in the reading achievement of students who are at risk for failure in reading. The increase in achievement scores in both the Woodcock-Johnson tests of achievement and the North Carolina End-of-Grade tests show statistically significant student improvement after only one academic year (or less) in the program.

Evaluation Report on the First Year Results from the Reading Achievement Program (RAP)

The Reading Achievement Program (RAP) is an initiative of The Hill Center, conducted in collaboration with the North Carolina GlaxoSmithKline Foundation and Durham Public Schools. RAP is a public school program where struggling readers are pulled out of their regular classrooms daily for short periods of time to receive specialized instruction. RTI International is evaluating this program as it is currently being implemented in Durham Public Schools.

This evaluation examines the effectiveness of the instructional methodologies of RAP by comparing student achievement data before and after participating in RAP for approximately one year. We compare student pre- and post-RAP scores on four subtests from the Woodcock-Johnson (WJ) Tests of Achievement (Letter-Word Identification, Reading Fluency, Passage Comprehension, and Word Attack) and on the North Carolina math and reading End-of-Grade (EOG) exams.

Because this study follows a “pre-post” design that does not randomly assign some students to a control group, it is possible that the results were influenced by unmeasured factor(s). However, the findings are still valuable in examining whether RAP has helped participating students.

Student Characteristics

Teachers were asked to nominate students who they thought would benefit from the program and who were at risk for failing the reading EOG exam. The nominated group included both students who had been formally identified as needing extra help and those who had not been formally identified as such.

During the first year of the program, we collected data on 76 students participating in RAP from 15 teachers in the Durham Public Schools. Because one of the participating teachers did not fully implement the RAP program, eight students were dropped from the data set, leaving a total of 68 students. Of the remaining teachers, three are from Easley Elementary School, four are from Forest View Elementary School, three are from Holt Elementary School, two are from Mangum Elementary School, one is from Oak Grove Elementary School, and one is from W.G. Pearson Lab Elementary School.

Table 1 shows the characteristics of the RAP students. These characteristics include: gender, race/ethnicity, eligibility for free or reduced-price lunch, English as a second language,

whether the student has been identified to receive exceptional children’s services, the type of disability for which the student has been identified, IQ, and whether the student has ever repeated a grade. Sections of Table 1 where the number of students does not add to 68 reflect missing data. The characteristics indicate that the students participating in RAP are truly at risk of not being successful in school: over one-half are eligible for free or reduced-price lunch, about one-quarter speak English as a second language, three-quarters were identified as eligible to receive exceptional children’s services, one-half have a learning disability, and one-half have repeated a grade.

Table 1. Characteristics of RAP Students

Gender

	Number of students	Percentage
Male	47	70
Female	20	30
Total	67	100

Race/ethnicity

	Number of students	Percentage
African-American	28	42
White	23	34
Hispanic	16	24
Total	67	100

Eligibility for free or reduced-price lunch

	Number of students	Percentage
Yes	38	57
No	29	43
Total	67	100

English as a Second Language

	Number of students	Percentage
Yes	16	24
No	51	76
Total	67	100

Identified to receive Exceptional Children's services

	Number of students	Percentage
Yes	49	73
No	18	27
Total	67	100

Type of disability for which student is identified to receive Exceptional Children's services

	Number of students	Percentage
Learning disability	36	53.7
Attention deficit disorder	5	7.4
Other	3	4.8
Unknown	5	7.4
Total	49*	73 (of total population)

IQ

	Number of students	Percentage
Below average (below 85)	18	39.1
Average (85-115)	27	58.7
Above average (above 115)	1	2.2
Total	46**	100

Repeated a Grade

	Number of students	Percentage
Yes	33	49
No	34	51
Total	67	100

*Because only 49 students (73 percent) were identified to receive exceptional children's services only those students are included here.

** Typically, only students identified to receive EC services take IQ tests. Also, IQ score data is missing for some identified students. Three IQ tests were used: 42 students took the WISC-III, four students took the UNIT, and two students took the DAS.

Although 76 students started RAP during the 2003-2004 school year, we do not have complete data for all of them. Only 60 students had enough data to be included in this analysis.

Findings

This section presents the findings from the analyses. Table 2 shows the number of hours of student participation in RAP by grade level. Overall, the average student spent 56.3 hours participating in RAP with a range of 11.3 to 99.8 hours.¹

Table 2. Student participation in RAP by grade level

Grade Level	Average number of hours of participation for students (range)
First (n = 2)	32.0 (15.8 to 48.2)*
Second (n = 14)	60.1 (16.5 to 90.0)*
Third (n = 33)	58.1 (11.3 to 99.8)*
Fourth (n = 15)	53.1 (12.7 to 99.0)*
Fifth (n = 3)	60.3 (49.5 to 69.8)

*A few students have a very low number of hours in RAP because they did not start the program until the spring of 2004.

Changes in the Woodcock-Johnson Test Scores After Participating in the RAP Program

Table 3 presents the change in students' Woodcock-Johnson test scores after participating in the RAP program. This table uses standard scores which are generally used when studying changes over time. Standard scores are used in this study to determine the amount of growth in student achievement during the period in which they were enrolled in RAP. "Standard" simply means that the scores have been transformed from raw scores for convenience and ease of interpretation. A student who makes the growth expected for a child of his/her age during a given school year would have the same standard score during the second year (post-test) as during the first (pre-test). The expected amount of change in an average child's score would therefore be zero. A change greater than zero indicates that a child is learning at a faster rate than expected for an average child that age. A change less than zero indicates the reverse, that the child is actually losing ground with respect to his/her peers. If the average change in scores for a group of students is greater than zero, this indicates the collective improvement of the group. The average standard score for the Woodcock-Johnson test is 100, with scores between 90 and 110 considered to be in the average range.²

¹ To calculate the total number of hours spent in RAP, we multiplied the total number of classes each student attended by the length of each class. We accounted for tardiness by subtracting the total number of minutes students were tardy from the total number of hours they attended class. (The six students reported as tardy missed from 30 minutes to 11.3 hours over the course of the school year.)

² Mather, N., & Woockcock, R.W. (2001). Examiner's Manual. *Woodcock-Johnson III Tests of Achievement*. Ithaca: Riverside Publishing.

Table 3. Change in Woodcock-Johnson III Standard Test Scores

	Pre-test mean (Range)	Post-test mean (Range)	Change in standard score (Range)	How does rate of learning compare to that expected of the average student?	Number of students
WJ test data³					
Letter-Word Identification	82.9 (56 to 116)	82.7 (61 to 113)	-0.3 (-11 to 21)	It is the same.	58
Reading Fluency	82.6 (58 to 112)	86.0 (63 to 109)	3.5 (-4 to 13)	It is faster. (t = 4.9***)	42 ⁺
Passage Comprehension	81.2 (50 to 109)	85.4 (61 to 112)	4.3 (-11 to 19)	It is faster. (t = 5.0***)	58
Word Attack	83.7 (48 to 113)	87.9 (65 to 106)	4.1 (-21 to 34)	It is faster. (t = 3.2***)	57

*** $p \leq .001$

⁺The number of students taking the Reading Fluency test was likely lower than for the other Woodcock-Johnson tests because a higher level of reading ability is required to take this test compared to the other tests.

As can be seen in Table 3, the changes in the Woodcock-Johnson scores of the RAP students are quite positive. Students in RAP showed statistically significant improvement on three of the four Woodcock-Johnson subtests. On these three subtests (Reading Fluency, Passage Comprehension, and Word Attack), RAP students actually progressed at a rate greater than that expected of the average student. Students reversed their pattern of falling behind in reading to progressing at a rate faster than that expected of the average student, thus narrowing the gap with average students. On all three of these subtests RAP students moved very close to (within 2 to 5 points of) the average score range (90 to 110) after participating in the program. On the Letter-Word Identification subtest, RAP students improved their score at the same rate as that expected of the average student. Improving at this rate is an accomplishment considering that at-risk students typically progress at a slower rate than average students. The strongest effects were on Passage Comprehension and Word Attack, where students gained 4.3 and 4.1 standard score points respectively.

³ Although students' pre-RAP Woodcock-Johnson scores were supposed to be collected within six months prior to their starting RAP, scores for a few students were collected outside of that time period – one 6.5 months before RAP, one 7.6 months before RAP, one 10.4 months before RAP, and two 11 months before RAP.

Changes in the End-of-Grade (EOG) Test Scores After Participating in the RAP Program

Table 4 presents the changes in students' EOG scores after participating in RAP. The scores in the table are developmental scale scores. The raw score for the test is converted into the developmental scale score to allow for the comparison of students' EOG scores from one year to the next. Thus, unlike the standard scores, an EOG score that remains unchanged from one year to the next indicates that a child has made no improvement during that year. The developmental scale scores are broken down into four levels, with levels I and II corresponding to below-grade-level achievement, and levels III and IV corresponding to at- or above-grade-level achievement.

The changes in the EOG scores of the RAP students show significant growth in achievement. Reading scores increased by a statistically significant amount: by 6 points for third graders and 7 points for fourth graders.⁴ Interestingly, though RAP focuses only on reading, student math scores also increased significantly: by 15 points for third graders and 4 points for fourth graders. Improvement in reading may have helped students perform better in math activities that require reading, such as word problems. These statistically significant results are especially powerful given the low number of students included in this part of the study (first and second graders do not take the EOG).

⁴ The fifth graders' results are not shown here because only three fifth graders participated in the RAP program this year.

Table 4: Change in End-of-Grade Test Scores

	Pre-RAP scale score	Post-RAP scale score	Change in scale score (Range)	Is change statistically significant?	Number of students	Number of students performing at or above grade level (EOG Level III or IV)	
End-of-Grade test data ⁵						Pre-RAP	Post-RAP
3rd Graders							
Reading End-of-Grade test	226.8	235.3	5.5 (-4 to 17)	Yes (t = 8.2***)	28	5 (Level III = 5, Level IV = 0)	7 (Level III = 6, Level IV = 1)
Math End-of-Grade test	230.2	245.3	15.1 (4 to 26)	Yes (t = 13.9***)	28	17 (Level III = 16, Level IV = 1)	14 (Level III = 14, Level IV = 0)
4th Graders							
Reading End-of-Grade test	234.7	241.3	6.5 (0 to 24)	Yes (t = 3.6**)	13	4 (Level III = 4, Level IV = 0)	4 (Level III = 2, Level IV = 2)
Math End-of-Grade test	248.9	252.5	3.5 (-3 to 13)	Yes (t = 3.1**)	13	10 (Level III = 8, Level IV = 2)	10 (Level III = 8, Level IV = 2)

*** $p \leq .001$, ** $p \leq .01$

The improvement in EOG scores can also be seen in the students' achievement level of performance. For third graders, five students scored at or above grade level in reading before participating in the RAP program, after participating in RAP seven students scored at or above grade level, including one student in level four (no third grade students scored in level four before the RAP program). For fourth graders, two of the four students who scored at grade level in reading (level III) before RAP scored above grade level in reading (level four) after RAP.

In summary, these results strongly support the premise that participation in RAP is related to an increase in the reading achievement of students who are at risk for failure in reading. Both the Woodcock-Johnson subtests and the North Carolina End-of-Grade tests show statistically significant improvement in student reading achievement during the course of one academic year or less. While there was little increase in the number of students performing at or above grade level in reading, it is possible that students' scores increased within levels but not

⁵ The scores presented here are developmental scale scores. The raw scores are converted into developmental scale scores to allow for the comparison of students' end-of-grade scores by subject from one grade to the next (NC Assessment Brief, March 2004).

sufficiently to move them to the next level. We believe that over time we will find more students moving between levels and an increasing percentage performing at or above grade level.